



SEQUENCE LISTING

<110> Smith, Daniel J.
Taubman, Martin A.

<120> Glucan Binding Protein and Glycosyltransferase Immunogens

<130> 25669-020

<140> 10/797,821
<141> 2004-03-09

<150> 10/383,930
<151> 2003-03-07

<150> 60/363,209
<151> 2002-03-07

<150> 60/402,483
<151> 2002-08-08

<150> 09/290,049
<151> 1999-04-12

<150> 60/081,550
<151> 1998-04-13

<150> 60/115,142
<151> 1999-01-08

<160> 45

<170> PatentIn version 3.2

<210> 1
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GpbB-derived MHC class II (SYI) peptide

<400> 1

Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys
1 5 10 15

Ser Val Ser Asp
20

<210> 2
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GpbB peptide

<400> 2

Lys His Lys Leu Ile Thr Ile Gln Gly Gln Val Ser Ala Leu Gln Thr
1 5 10 15

Gln Gln Ala Gly
20

<210> 3
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GpbB peptide

<400> 3

Thr Ala Thr Glu Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr Ala Ala
1 5 10 15

Val Ala Ala Asn
20

<210> 4
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 4

Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu Ser Ser Ala Thr Thr
1 5 10 15

Leu Ser Ala Val
20

<210> 5
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 5

Leu Ser Ser Ala Thr Thr Leu Ser Ala Val Lys Ala Asp Asp Phe Asp
1 5 10 15

Ala Gln Ile Ala
20

<210> 6

<211> 20

<212> PRT

<213> Artificial

<220>

<223> GbpB peptide

<400> 6

Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
1 5 10 15

Gln Ala Ala Gln
20

<210> 7

<211> 20

<212> PRT

<213> Artificial

<220>

<223> GbpB peptide

<400> 7

Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln Gln Ala Ala Gln
1 5 10 15

Ala Gln Val Asn
20

<210> 8

<211> 20

<212> PRT

<213> Artificial

<220>

<223> GbpB peptide

<400> 8

Gln Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser

1 5 10 15

Ala Leu Gln Thr
20

<210> 9
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 9

Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala Leu Gln Thr
1 5 10 15

Gln Gln Ala Glu
20

<210> 10
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 10

Gln Gln Ile Gln Thr Leu Ser Ser Lys Ile Val Ala Arg Asn Glu Ser
1 5 10 15

Leu Lys Gln Gln
20

<210> 11
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 11

Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys Ser Val Ser Asp
1 5 10 15

Ala Ile Asn Arg
20

<210> 12
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 12

Val Ser Ala Ile Arg Glu Val Val Ser Ala Asn Glu Lys Met Leu Gln
1 5 10 15

Gln Gln Glu Gln
20

<210> 13
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 13

Thr Val Ala Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu
1 5 10 15

Asn Thr Gln Gln
20

<210> 14
<211> 20
<212> PRT
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<220>
<223> GbpB peptide

<400> 14

Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr Thr
1 5 10 15

Ala Gln Asp Gln
20

<210> 15
<211> 20
<212> PRT
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<220>
<223> GbpB peptide

<400> 15

Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala Glu Glu Ala Ala Arg
1 5 10 15

Gln Ala Ala Ala
20

<210> 16
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 16

Ala Leu Gln Glu Gln Ala Ala Gln Ala Gln Val Ala Ala Asn Asn Asn
1 5 10 15

Thr Gln Ala Thr
20

<210> 17
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<220>
<223> GbpB peptide

<400> 17

Thr Glu Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu Ser
1 5 10 15

Thr Thr Ala Thr
20

<210> 18
<211> 20

<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 18

Gln Pro Ser Ala Ser Ser Ala Ser Thr Ala Ala Val Ala Ala Asn Thr
1 5 10 15

Ser Ser Ala Asn
20

<210> 19
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 19

Gly Asn Tyr Trp Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala
1 5 10 15

Ala Gly Tyr Arg
20

<210> 20
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 20

Ala Gly Tyr Arg Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val
1 5 10 15

Trp Asn Asp Gly
20

<210> 21
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 21

Asp Gly Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly
1 5 10 15

Gln Ile Gln Val
20

<210> 22
<211> 20
<212> PRT
<213> Artificial

<220>
<223> GbpB peptide

<400> 22

Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn Tyr Arg Gly
1 5 10 15

Trp Phe Asn Pro
20

<210> 23
<211> 22
<212> PRT
<213> Artificial

<220>
<223> GTF-derived glucan binding (GLU) peptide

<400> 23

Thr Gly Ala Gln Thr Ile Lys Gly Gln Lys Leu Tyr Phe Lys Ala Asn
1 5 10 15

Gly Gln Gln Val Lys Gly
20

<210> 24
<211> 21
<212> PRT
<213> Streptococcus mutans

<400> 24

Asp Ala Asn Phe Asp Ser Ile Arg Val Asp Ala Val Asp Asn Val Asp

1	5	10	15
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Ala Asp Leu Leu Gln
20

<210> 25
 <211> 22
 <212> PRT
 <213> Artificial

<220>
 <223> GTF-derived catalytic (CAT) peptide

<400> 25

Asp	Ala	Asn	Phe	Asp	Ser	Ile	Arg	Val	Asp	Ala	Val	Asp	Asn	Val	Asp
1				5				10					15		

Ala Asp Leu Leu Gln Ile
20

<210> 26
 <211> 25
 <212> PRT
 <213> Artificial

<220>
 <223> Catalytic Domain GTF peptide

<400> 26

Pro	Leu	Asp	Lys	Arg	Ser	Gly	Leu	Asn	Pro	Leu	Ile	His	Asn	Ser	Leu
1				5				10					15		

Val Asp Arg Glu Val Asp Asp Arg Glu
20 25

<210> 27
 <211> 20
 <212> PRT
 <213> Artificial

<220>
 <223> Glucan-Binding Domain GTF Peptide

<400> 27

Asp	Gly	Lys	Leu	Arg	Tyr	Tyr	Asp	Ala	Asn	Ser	Gly	Asp	Gln	Ala	Phe
1				5				10					15		

Asn Lys Ser Val
20

<210> 28
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Surface Domain GTF Peptide

<400> 28

Gln Trp Asn Gly Glu Ser Glu Lys Pro Tyr Asp Asp His Leu
1 5 10

<210> 29
<211> 431
<212> PRT
<213> Streptococcus mutans

<400> 29

Met Lys Lys Arg Ile Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu
1 5 10 15

Ser Ser Ala Thr Thr Leu Ser Ala Val Lys Ala Asp Asp Phe Asp Ala
20 25 30

Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
35 40 45

Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala
50 55 60

Leu Gln Thr Gln Gln Ala Glu Leu Gln Ala Glu Asn Gln Arg Leu Glu
65 70 75 80

Ala Gln Ser Ala Thr Leu Gly Gln Gln Ile Gln Thr Leu Ser Ser Lys
85 90 95

Ile Val Ala Arg Asn Glu Ser Leu Lys Gln Gln Ala Arg Ser Ala Gln
100 105 110

Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys
115 120 125

Ser Val Ser Asp Ala Ile Asn Arg Val Ser Ala Ile Arg Glu Val Val
 130 135 140

Ser Ala Asn Glu Lys Met Leu Gln Gln Gln Glu Gln Asp Lys Ala Ala
 145 150 155 160

Val Glu Gln Lys Gln Gln Glu Asn Gln Ala Ala Ile Asn Thr Val Ala
 165 170 175

Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu Asn Thr Gln
 180 185 190

Gln Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr
 195 200 205

Thr Ala Gln Asp Gln Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala
 210 215 220

Glu Glu Ala Ala Arg Gln Ala Ala Ala Ala Gln Ala Ala Ala Glu Ala
 225 230 235 240

Lys Ala Ala Ala Glu Ala Lys Ala Leu Gln Glu Gln Ala Ala Gln Ala
 245 250 255

Gln Val Ala Ala Asn Asn Asn Thr Gln Ala Thr Asp Ala Ser Asp Gln
 260 265 270

Gln Ala Ala Ala Ala Asp Asn Thr Gln Ala Ala Gln Thr Gly Asp Ser
 275 280 285

Thr Glu Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu Ser
 290 295 300

Thr Thr Ala Thr Glu Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr Ala
 305 310 315 320

Ala Val Ala Ala Asn Thr Ser Ser Ala Asn Thr Tyr Pro Ala Gly Gln
 325 330 335

Cys Thr Trp Gly Val Lys Ser Leu Ala Pro Trp Val Gly Asn Tyr Trp
 340 345 350

Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala Ala Gly Tyr Arg

355 360 365
 Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val Trp Asn Asp Gly
 370 375 380

 Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly Gln Ile
 385 390 395 400

 Gln Val Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn Tyr
 405 410 415

 Arg Gly Trp Phe Asn Pro Gly Ser Val Ser Tyr Ile Tyr Pro Asn
 420 425 430

 <210> 30
 <211> 431
 <212> PRT
 <213> Streptococcus mutans

 <400> 30

 Met Lys Lys Arg Ile Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu
 1 5 10 15

 Ser Ser Ala Thr Thr Leu Ser Ala Val Lys Ala Asp Asp Phe Asp Ala
 20 25 30

 Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
 35 40 45

 Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala
 50 55 60

 Leu Gln Thr Gln Gln Ala Glu Leu Gln Ala Glu Asn Gln Arg Leu Glu
 65 70 75 80

 Ala Gln Ser Ala Thr Leu Gly Gln Gln Ile Gln Thr Leu Ser Ser Lys
 85 90 95

 Ile Val Ala Arg Asn Glu Ser Leu Lys Gln Gln Ala Arg Ser Ala Gln
 100 105 110

 Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys
 115 120 125

Ser Val Ser Asp Ala Ile Asn Arg Val Ser Ala Ile Arg Glu Val Val
130 135 140

Ser Ala Asn Glu Lys Met Leu Gln Gln Gln Glu Gln Asp Lys Ala Ala
145 150 155 160

Val Glu Gln Lys Gln Gln Glu Asn Gln Ala Ala Ile Asn Thr Val Ala
165 170 175

Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu Asn Thr Gln
180 185 190

Gln Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr
195 200 205

Thr Ala Gln Asp Gln Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala
210 215 220

Glu Glu Ala Ala Arg Gln Ala Ala Ala Ala Gln Ala Ala Ala Glu Ala
225 230 235 240

Lys Ala Ala Ala Glu Ala Lys Ala Leu Gln Glu Gln Ala Ala Gln Ala
245 250 255

Gln Ala Ala Ala Asn Asn Asn Thr Gln Ala Thr Asp Ala Ser Asp Gln
260 265 270

Gln Ala Ala Ala Ala Asp Asn Thr Gln Ala Ala Gln Thr Gly Asp Ser
275 280 285

Thr Glu Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu Ser
290 295 300

Thr Thr Ala Thr Glu Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr Ala
305 310 315 320

Ala Val Ala Ala Asn Thr Ser Ser Ala Asn Thr Tyr Pro Ala Gly Gln
325 330 335

Cys Thr Trp Gly Val Lys Ser Leu Ala Pro Trp Val Gly Asn Tyr Trp
340 345 350

Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala Ala Gly Tyr Arg
 355 360 365

Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val Trp Asn Asp Gly
 370 375 380

Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly Gln Ile
 385 390 395 400

Gln Val Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn Tyr
 405 410 415

Arg Gly Trp Phe Asn Pro Gly Ser Val Ser Tyr Ile Tyr Pro Asn
 420 425 430

<210> 31
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 <212> PRT
 <213> Streptococcus mutans

<400> 31

Met Lys Lys Arg Ile Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu
 1 5 10 15

Ser Ser Ala Thr Thr Leu Ser Ala Ile Lys Ala Asp Asp Phe Asp Ala
 20 25 30

Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
 35 40 45

Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala
 50 55 60

Leu Gln Thr Gln Gln Ala Glu Leu Gln Ala Glu Asn Gln Arg Leu Glu
 65 70 75 80

Ala Gln Ser Ala Thr Leu Gly Gln Gln Ile Gln Thr Leu Ser Ser Lys
 85 90 95

Ile Val Ala Arg Asn Glu Ser Leu Lys Gln Gln Ala Arg Ser Ala Gln
 100 105 110

Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys
 115 120 125

Ser Val Ser Asp Ala Ile Asn Arg Val Ser Ala Ile Arg Glu Val Val
130 135 140

Ser Ala Asn Glu Lys Met Leu Gln Gln Gln Glu Gln Asp Lys Ala Ala
145 150 155 160

Val Glu Gln Lys Gln Gln Glu Asn Gln Ala Ala Ile Asn Thr Val Ala
165 170 175

Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu Asn Thr Gln
180 185 190

Gln Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr
195 200 205

Thr Ala Gln Asp Gln Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala
210 215 220

Glu Glu Ala Ala Arg Gln Ala Ala Ala Ala Gln Ala Ala Ala Glu Ala
225 230 235 240

Lys Ala Ala Ala Glu Ala Lys Ala Leu Gln Glu Gln Ala Ala Gln Ala
245 250 255

Gln Ala Ala Ala Asn Asn Asn Asn Thr Gln Ala Thr Asp Ala Ser Asp
260 265 270

Gln Gln Ala Ala Ala Asp Asn Thr Gln Ala Ala Gln Thr Gly Asp
275 280 285

Ser Thr Asp Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu
290 295 300

Ser Thr Thr Ala Thr Ala Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr
305 310 315 320

Ala Ala Val Ala Ala Asn Thr Ser Ser Ala Asn Thr Tyr Pro Ala Gly
325 330 335

Gln Cys Thr Trp Gly Val Lys Ser Leu Ala Pro Trp Val Gly Asn Tyr
340 345 350

Trp Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala Gly Tyr
 355 360 365

Arg Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val Trp Asn Asp
 370 375 380

Gly Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly Gln
 385 390 395 400

Ile Gln Val Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn
 405 410 415

Tyr Arg Gly Trp Phe Asn Pro Gly Ser Val Ser Tyr Ile Tyr Pro Asn
 420 425 430

<210> 32
 <211> 432
 <212> PRT
 <213> Streptococcus mutans

<400> 32

Met Lys Lys Arg Ile Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu
 1 5 10 15

Ser Ser Ala Thr Thr Leu Ser Ala Val Lys Ala Asp Asp Phe Asp Ala
 20 25 30

Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
 35 40 45

Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala
 50 55 60

Leu Gln Thr Gln Gln Ala Glu Leu Gln Ala Glu Asn Gln Arg Leu Glu
 65 70 75 80

Ala Gln Ser Ala Thr Leu Gly Gln Gln Ile Gln Thr Leu Ser Ser Lys
 85 90 95

Ile Val Ala Arg Asn Glu Ser Leu Lys Gln Gln Ala Arg Ser Ala Gln
 100 105 110

Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys

115		120		125
Ser Val Ser Asp Ala Ile Asn Arg Val Ser Ala Ile Arg Glu Val Val				
130		135		140
Ser Ala Asn Glu Lys Met Leu His Gln Gln Glu Gln Asp Lys Ala Ala				
145		150		155
				160
Val Glu Gln Lys His Gln Glu Asn Gln Ala Ala Ile Asn Thr Val Ala				
		165		170
				175
Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu Asn Thr Gln				
		180		185
				190
Gln Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr				
		195		200
				205
Thr Ala Gln Asp Gln Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala				
		210		215
				220
Glu Glu Ala Ala Arg Gln Ala Ala Ala Ala Gln Ala Ala Ala Glu Ala				
		225		230
				235
				240
Lys Ala Ala Ala Glu Ala Lys Ala Leu Gln Glu Gln Ala Ala Gln Ala				
		245		250
				255
Gln Ala Ala Ala Asn Asn Asn Asn Thr Gln Ala Thr Asp Ala Ser Asp				
		260		265
				270
Gln Gln Ala Ala Ala Asp Asn Thr Gln Ala Ala Gln Thr Gly Asp				
		275		280
				285
Ser Thr Asp Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu				
		290		295
				300
Ser Thr Thr Ala Thr Ala Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr				
		305		310
				315
				320
Ala Ala Val Ala Ala Asn Thr Ser Ser Ala Asn Thr Tyr Pro Ala Gly				
		325		330
				335
Gln Cys Thr Trp Gly Val Lys Ser Leu Ala Pro Trp Val Gly Asn Tyr				
		340		345
				350

Trp Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala Ala Gly Tyr
 355 360 365

Arg Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val Trp Asn Asp
 370 375 380

Gly Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly Gln
 385 390 395 400

Ile Gln Val Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn
 405 410 415

Tyr Arg Gly Trp Phe Asn Pro Gly Ser Val Ser Tyr Ile Tyr Pro Asn
 420 425 430

<210> 33
 <211> 431
 <212> PRT
 <213> Streptococcus mutans

<400> 33

Met Lys Lys Arg Ile Leu Ser Ala Val Leu Val Ser Gly Val Thr Leu
 1 5 10 15

Ser Ser Ala Thr Thr Leu Ser Ala Val Lys Ala Asp Asp Phe Asp Ala
 20 25 30

Gln Ile Ala Ser Gln Asp Ser Lys Ile Asn Asn Leu Thr Ala Gln Gln
 35 40 45

Gln Ala Ala Gln Ala Gln Val Asn Thr Ile Gln Gly Gln Val Ser Ala
 50 55 60

Leu Gln Thr Gln Gln Ala Glu Leu Gln Ala Glu Asn Gln Arg Leu Glu
 65 70 75 80

Ala Gln Ser Ala Thr Leu Gly Gln Gln Ile Gln Thr Leu Ser Ser Lys
 85 90 95

Ile Val Ala Arg Asn Glu Ser Leu Lys Gln Gln Ala Arg Ser Ala Gln
 100 105 110

Lys Ser Asn Ala Ala Thr Ser Tyr Ile Asn Ala Ile Ile Asn Ser Lys
 115 120 125

Ser Val Ser Asp Ala Ile Asn Arg Val Ser Ala Ile Arg Glu Val Val
 130 135 140

Ser Ala Asn Glu Lys Met Leu Gln Gln Gln Glu Gln Asp Lys Ala Ala
 145 150 155 160

Val Glu Gln Lys Gln Gln Glu Asn Gln Ala Ala Ile Asn Thr Val Ala
 165 170 175

Ala Asn Gln Glu Thr Ile Ala Gln Asn Thr Asn Ala Leu Asn Thr Gln
 180 185 190

Gln Ala Gln Leu Glu Ala Ala Gln Leu Asn Leu Gln Ala Glu Leu Thr
 195 200 205

Thr Ala Gln Asp Gln Lys Ala Thr Leu Val Ala Gln Lys Ala Ala Ala
 210 215 220

Glu Glu Ala Ala Arg Gln Ala Ala Ala Ala Gln Ala Ala Ala Glu Ala
 225 230 235 240

Lys Ala Ala Ala Glu Ala Lys Ala Leu Gln Glu Gln Ala Ala Gln Ala
 245 250 255

Gln Ala Ala Ala Asn Asn Asn Thr Gln Ala Thr Asp Ala Ser Asp Gln
 260 265 270

Gln Ala Ala Ala Ala Asp Asn Thr Gln Ala Ala Gln Thr Gly Asp Ser
 275 280 285

Thr Glu Gln Ser Ala Ala Gln Ala Val Asn Asn Ser Asp Gln Glu Ser
 290 295 300

Thr Thr Ala Thr Glu Ala Gln Pro Ser Ala Ser Ser Ala Ser Thr Ala
 305 310 315 320

Val Val Thr Ala Asn Thr Ser Ser Ala Asn Thr Tyr Pro Ala Gly Gln
 325 330 335

Cys Thr Trp Gly Val Lys Ser Leu Ala Pro Trp Val Gly Asn Tyr Trp

	340		345		350
Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala Gly Tyr Arg	355	360	365		
Val Gly Ser Thr Pro Ser Ala Gly Ala Val Ala Val Trp Asn Asp Gly	370	375	380		
Gly Tyr Gly His Val Ala Tyr Val Thr Gly Val Gln Gly Gly Gln Ile	385	390	395	400	
Gln Val Gln Glu Ala Asn Tyr Ala Gly Asn Gln Ser Ile Gly Asn Tyr	405	410	415		
Arg Gly Trp Phe Asn Pro Gly Ser Val Ser Tyr Ile Tyr Pro Asn	420	425	430		
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<211> 1475					
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<213> Streptococcus mutans					
<400> 34					
Met Asp Lys Lys Val Arg Tyr Lys Leu Arg Lys Val Lys Lys Arg Trp	1	5	10	15	
Val Thr Val Ser Val Ala Ser Ala Val Met Thr Leu Thr Thr Leu Ser	20	25	30		
Gly Gly Leu Val Lys Ala Asp Ser Asn Glu Ser Lys Ser Gln Ile Ser	35	40	45		
Asn Asp Ser Asn Thr Ser Val Val Thr Ala Asn Glu Glu Ser Asn Val	50	55	60		
Ile Thr Glu Ala Thr Ser Lys Gln Glu Ala Ala Ser Ser Gln Thr Asn	65	70	75	80	
His Thr Val Thr Thr Ser Ser Ser Ser Thr Ser Val Val Asn Pro Lys	85	90	95		
Glu Val Val Ser Asn Pro Tyr Thr Val Gly Glu Thr Ala Ser Asn Gly	100	105	110		

Glu Lys Leu Gln Asn Gln Thr Thr Thr Val Asp Lys Thr Ser Glu Ala
 115 120 125

Ala Ala Asn Asn Ile Ser Lys Gln Thr Thr Glu Ala Asp Thr Asp Val
 130 135 140

Ile Asp Asp Ser Asn Ala Ala Asn Leu Gln Ile Leu Glu Lys Leu Pro
 145 150 155 160

Asn Val Lys Glu Ile Asp Gly Lys Tyr Tyr Tyr Tyr Asp Asn Asn Gly
 165 170 175

Lys Val Arg Thr Asn Phe Thr Leu Ile Ala Asp Gly Lys Ile Leu His
 180 185 190

Phe Asp Glu Thr Gly Ala Tyr Thr Asp Thr Ser Ile Asp Thr Val Asn
 195 200 205

Lys Asp Ile Val Thr Thr Arg Ser Asn Leu Tyr Lys Lys Tyr Asn Gln
 210 215 220

Val Tyr Asp Arg Ser Ala Gln Ser Phe Glu His Val Asp His Tyr Leu
 225 230 235 240

Thr Ala Glu Ser Trp Tyr Arg Pro Lys Tyr Ile Leu Lys Asp Gly Lys
 245 250 255

Thr Trp Thr Gln Ser Thr Glu Lys Asp Phe Arg Pro Leu Leu Met Thr
 260 265 270

Trp Trp Pro Asp Gln Glu Thr Gln Arg Gln Tyr Val Asn Tyr Met Asn
 275 280 285

Ala Gln Leu Gly Ile Asn Lys Thr Tyr Asp Asp Thr Ser Asn Gln Leu
 290 295 300

Gln Leu Asn Ile Ala Ala Ala Thr Ile Gln Ala Lys Ile Glu Ala Lys
 305 310 315 320

Ile Thr Thr Leu Lys Asn Thr Asp Trp Leu Arg Gln Thr Ile Ser Ala
 325 330 335

Phe Val Lys Thr Gln Ser Ala Trp Asn Ser Asp Ser Glu Lys Pro Phe
 340 345 350

Asp Asp His Leu Gln Asn Gly Ala Val Leu Tyr Asp Asn Glu Gly Lys
 355 360 365

Leu Thr Pro Tyr Ala Asn Ser Asn Tyr Arg Ile Leu Asn Arg Thr Pro
 370 375 380

Thr Asn Gln Thr Gly Lys Lys Asp Pro Arg Tyr Thr Ala Asp Asn Thr
 385 390 395 400

Ile Gly Gly Tyr Glu Phe Leu Leu Ala Asn Asp Val Asp Asn Ser Asn
 405 410 415

Pro Val Val Gln Ala Glu Gln Leu Asn Trp Leu His Phe Leu Met Asn
 420 425 430

Phe Gly Asn Ile Tyr Ala Asn Asp Pro Asp Ala Asn Phe Asp Ser Ile
 435 440 445

Arg Val Asp Ala Val Asp Asn Val Asp Ala Asp Leu Leu Gln Ile Ala
 450 455 460

Gly Asp Tyr Leu Lys Ala Ala Lys Gly Ile His Lys Asn Asp Lys Ala
 465 470 475 480

Ala Asn Asp His Leu Ser Ile Leu Glu Ala Trp Ser Asp Asn Asp Thr
 485 490 495

Pro Tyr Leu His Asp Asp Gly Asp Asn Met Ile Asn Met Asp Asn Lys
 500 505 510

Leu Arg Leu Ser Leu Leu Phe Ser Leu Ala Lys Pro Leu Asn Gln Arg
 515 520 525

Ser Gly Met Asn Pro Leu Ile Thr Asn Ser Leu Val Asn Arg Thr Asp
 530 535 540

Asp Asn Ala Glu Thr Ala Ala Val Pro Ser Tyr Ser Phe Ile Arg Ala
 545 550 555 560

His Asp Ser Glu Val Gln Asp Leu Ile Ala Asp Ile Ile Lys Ala Glu

565					570					575					
Ile	Asn	Pro	Asn	Val	Val	Gly	Tyr	Ser	Phe	Thr	Met	Glu	Glu	Ile	Lys
			580					585					590		
Lys	Ala	Phe	Glu	Ile	Tyr	Asn	Lys	Asp	Leu	Leu	Ala	Thr	Glu	Lys	Lys
		595					600						605		
Tyr	Thr	His	Tyr	Asn	Thr	Ala	Leu	Ser	Tyr	Ala	Leu	Leu	Leu	Thr	Asn
	610					615					620				
Lys	Ser	Ser	Val	Pro	Arg	Val	Tyr	Tyr	Gly	Asp	Met	Phe	Thr	Asp	Asp
625						630					635				640
Gly	Gln	Tyr	Met	Ala	His	Lys	Thr	Ile	Asn	Tyr	Glu	Ala	Ile	Glu	Thr
				645					650					655	
Leu	Leu	Lys	Ala	Arg	Ile	Lys	Tyr	Val	Ser	Gly	Gly	Gln	Ala	Met	Arg
			660					665						670	
Asn	Gln	Gln	Val	Gly	Asn	Ser	Glu	Ile	Ile	Thr	Ser	Val	Arg	Tyr	Gly
		675					680					685			
Lys	Gly	Ala	Leu	Lys	Ala	Thr	Asp	Thr	Gly	Asp	Arg	Thr	Thr	Arg	Thr
	690						695				700				
Ser	Gly	Val	Ala	Val	Ile	Glu	Gly	Asn	Asn	Pro	Ser	Leu	Arg	Leu	Lys
705						710					715				720
Ala	Ser	Asp	Arg	Val	Val	Val	Asn	Met	Gly	Ala	Ala	His	Lys	Asn	Gln
				725					730					735	
Ala	Tyr	Arg	Pro	Leu	Leu	Leu	Thr	Thr	Asp	Asn	Gly	Ile	Lys	Ala	Tyr
			740					745					750		
His	Ser	Asp	Gln	Glu	Ala	Ala	Gly	Leu	Val	Arg	Tyr	Thr	Asn	Asp	Arg
		755					760						765		
Gly	Glu	Leu	Ile	Phe	Thr	Ala	Ala	Asp	Ile	Lys	Gly	Tyr	Ala	Asn	Pro
	770						775					780			
Gln	Val	Ser	Gly	Tyr	Leu	Gly	Val	Trp	Val	Pro	Val	Gly	Ala	Ala	Leu
785						790					795				800

Ile Lys Met Phe Ala Leu Arg Leu Ala Arg Pro His Gln Gln Met Ala
 805 810 815

Ser Val His Gln Asn Ala Ala Leu Asp Ser Arg Val Met Phe Glu Gly
 820 825 830

Phe Ser Asn Phe Gln Ala Phe Ala Thr Lys Lys Glu Glu Tyr Thr Asn
 835 840 845

Val Val Ile Ala Lys Asn Val Asp Lys Phe Ala Glu Trp Gly Val Thr
 850 855 860

Asp Phe Glu Met Ala Pro Gln Tyr Val Ser Ser Thr Asp Gly Ser Phe
 865 870 875 880

Leu Asp Ser Val Ile Gln Asn Gly Tyr Ala Phe Thr Asp Arg Tyr Asp
 885 890 895

Leu Gly Ile Ser Lys Pro Asn Lys Tyr Gly Thr Ala Asp Asp Leu Val
 900 905 910

Lys Ala Ile Lys Ala Leu His Ser Lys Gly Ile Lys Val Met Ala Asp
 915 920 925

Trp Val Pro Asp Gln Met Tyr Ala Phe Pro Glu Lys Glu Val Val Thr
 930 935 940

Ala Thr Arg Val Asp Lys Tyr Gly Thr Pro Val Ala Gly Ser Gln Ile
 945 950 955 960

Lys Asn Thr Leu Tyr Val Val Asp Gly Lys Ser Ser Gly Lys Asp Gln
 965 970 975

Gln Ala Lys Tyr Gly Gly Ala Phe Leu Glu Glu Leu Gln Ala Lys Tyr
 980 985 990

Pro Glu Leu Phe Ala Arg Lys Gln Ile Ser Thr Gly Val Pro Met Asp
 995 1000 1005

Pro Ser Val Lys Ile Lys Gln Trp Ser Ala Lys Tyr Phe Asn Gly
 1010 1015 1020

Thr	Asn	Ile	Leu	Gly	Arg	Gly	Ala	Gly	Tyr	Val	Leu	Lys	Asp	Gln
1025						1030					1035			
Ala	Thr	Asn	Thr	Tyr	Phe	Asn	Ile	Ser	Asp	Asn	Lys	Glu	Ile	Asn
1040						1045					1050			
Phe	Leu	Pro	Lys	Thr	Leu	Leu	Asn	Gln	Asp	Ser	Gln	Val	Gly	Phe
1055						1060					1065			
Ser	Tyr	Asp	Gly	Lys	Gly	Tyr	Val	Tyr	Tyr	Ser	Thr	Ser	Gly	Tyr
1070						1075					1080			
Gln	Ala	Lys	Asn	Thr	Phe	Ile	Ser	Glu	Gly	Asp	Lys	Trp	Tyr	Tyr
1085						1090					1095			
Phe	Asp	Asn	Asn	Gly	Tyr	Met	Val	Thr	Gly	Ala	Gln	Ser	Ile	Asn
1100						1105					1110			
Gly	Val	Asn	Tyr	Tyr	Phe	Leu	Ser	Asn	Gly	Leu	Gln	Leu	Arg	Asp
1115						1120					1125			
Ala	Ile	Leu	Lys	Asn	Glu	Asp	Gly	Thr	Tyr	Ala	Tyr	Tyr	Gly	Asn
1130						1135					1140			
Asp	Gly	Arg	Arg	Tyr	Glu	Asn	Gly	Tyr	Tyr	Gln	Phe	Met	Ser	Gly
1145						1150					1155			
Val	Trp	Arg	His	Phe	Asn	Asn	Gly	Glu	Met	Ser	Val	Gly	Leu	Thr
1160						1165					1170			
Val	Ile	Asp	Gly	Gln	Val	Gln	Tyr	Phe	Asp	Glu	Met	Gly	Tyr	Gln
1175						1180					1185			
Ala	Lys	Gly	Lys	Phe	Val	Thr	Thr	Ala	Asp	Gly	Lys	Ile	Arg	Tyr
1190						1195					1200			
Phe	Asp	Lys	Gln	Ser	Gly	Asn	Met	Tyr	Arg	Asn	Arg	Phe	Ile	Glu
1205						1210					1215			
Asn	Glu	Glu	Gly	Lys	Trp	Leu	Tyr	Leu	Gly	Glu	Asp	Gly	Ala	Ala
1220						1225					1230			

Val	Thr	Gly	Ser	Gln	Thr	Ile	Asn	Gly	Gln	His	Leu	Tyr	Phe	Arg
1235						1240					1245			
Ala	Asn	Gly	Val	Gln	Val	Lys	Gly	Glu	Phe	Val	Thr	Asp	His	His
1250						1255					1260			
Gly	Arg	Ile	Ser	Tyr	Tyr	Asp	Gly	Asn	Ser	Gly	Asp	Gln	Ile	Arg
1265						1270					1275			
Asn	Arg	Phe	Val	Arg	Asn	Ala	Gln	Gly	Gln	Trp	Phe	Tyr	Phe	Asp
1280						1285					1290			
Asn	Asn	Gly	Tyr	Ala	Val	Thr	Gly	Ala	Arg	Thr	Ile	Asn	Gly	Gln
1295						1300					1305			
Leu	Leu	Tyr	Phe	Arg	Ala	Asn	Gly	Val	Gln	Val	Lys	Gly	Glu	Phe
1310						1315					1320			
Val	Thr	Asp	Arg	Tyr	Gly	Arg	Ile	Ser	Tyr	Tyr	Asp	Gly	Asn	Ser
1325						1330					1335			
Gly	Asp	Gln	Ile	Arg	Asn	Arg	Phe	Val	Arg	Asn	Ala	Gln	Gly	Gln
1340						1345					1350			
Trp	Phe	Tyr	Phe	Asp	Asn	Asn	Gly	Tyr	Ala	Val	Thr	Gly	Ala	Arg
1355						1360					1365			
Thr	Ile	Asn	Gly	Gln	His	Leu	Tyr	Phe	Arg	Ala	Asn	Gly	Val	Gln
1370						1375					1380			
Val	Lys	Gly	Glu	Phe	Val	Thr	Asp	Arg	His	Gly	Arg	Ile	Ser	Tyr
1385						1390					1395			
Tyr	Asp	Gly	Asn	Ser	Gly	Asp	Gln	Ile	Arg	Asn	Arg	Phe	Val	Arg
1400						1405					1410			
Asn	Ala	Gln	Gly	Gln	Trp	Phe	Tyr	Phe	Asp	Asn	Asn	Gly	Tyr	Ala
1415						1420					1425			
Val	Thr	Gly	Ala	Arg	Thr	Ile	Asn	Gly	Gln	His	Leu	Tyr	Phe	Arg
1430						1435					1440			
Ala	Asn	Gly	Val	Gln	Val	Lys	Gly	Glu	Phe	Val	Thr	Asp	Arg	Tyr

1445 1450 1455
 Gly Arg Ile Ser Tyr Tyr Asp Ala Asn Ser Gly Glu Arg Val Arg
 1460 1465 1470

 Ile Asn
 1475

 <210> 35
 <211> 1375
 <212> PRT
 <213> Streptococcus mutans

 <400> 35

 Met Glu Lys Lys Val Arg Phe Lys Leu Arg Lys Val Lys Lys Arg Trp
 1 5 10 15

 Val Thr Val Ser Ile Ala Ser Ala Val Val Thr Leu Thr Ser Leu Ser
 20 25 30

 Gly Ser Leu Val Lys Ala Asp Ser Thr Asp Asp Arg Gln Gln Ala Val
 35 40 45

 Thr Glu Ser Gln Ala Ser Leu Val Thr Thr Ser Glu Ala Ala Lys Glu
 50 55 60

 Thr Leu Thr Ala Thr Asp Thr Ser Thr Ala Thr Ser Ala Thr Ser Gln
 65 70 75 80

 Pro Thr Ala Thr Val Thr Asp Asn Val Ser Thr Thr Asn Gln Ser Thr
 85 90 95

 Asn Thr Thr Ala Asn Thr Ala Asn Phe Val Val Lys Pro Thr Thr Thr
 100 105 110

 Ser Glu Gln Ala Lys Thr Asp Asn Ser Asp Lys Ile Ile Thr Thr Ser
 115 120 125

 Lys Ala Val Asn Arg Leu Thr Ala Thr Gly Lys Phe Val Pro Ala Asn
 130 135 140

 Asn Asn Thr Ala His Pro Lys Thr Val Thr Asp Lys Ile Val Pro Ile
 145 150 155 160

Lys Pro Lys Ile Gly Lys Leu Lys Gln Pro Ser Ser Leu Ser Gln Asp
 165 170 175

Asp Ile Ala Ala Leu Gly Asn Val Lys Asn Ile Arg Lys Val Asn Gly
 180 185 190

Lys Tyr Tyr Tyr Tyr Lys Glu Asp Gly Thr Leu Gln Lys Asn Tyr Ala
 195 200 205

Leu Asn Ile Asn Gly Lys Thr Phe Phe Phe Asp Glu Thr Gly Ala Leu
 210 215 220

Ser Asn Asn Thr Leu Pro Ser Lys Lys Gly Asn Ile Thr Asn Asn Asp
 225 230 235 240

Asn Thr Asn Ser Phe Ala Gln Tyr Asn Gln Val Tyr Ser Thr Asp Val
 245 250 255

Ala Asn Phe Glu His Val Asp His Tyr Leu Thr Ala Glu Ser Trp Tyr
 260 265 270

Arg Pro Lys Tyr Ile Leu Lys Asp Gly Lys Thr Trp Thr Gln Ser Thr
 275 280 285

Glu Lys Asp Phe Arg Pro Leu Leu Met Thr Trp Trp Pro Asp Gln Glu
 290 295 300

Thr Gln Arg Gln Tyr Val Asn Tyr Met Asn Ala Gln Leu Gly Ile His
 305 310 315 320

Gln Thr Tyr Asn Thr Ala Thr Ser Pro Leu Gln Leu Asn Leu Ala Ala
 325 330 335

Gln Thr Ile Gln Thr Lys Ile Glu Glu Lys Ile Thr Ala Glu Lys Asn
 340 345 350

Thr Asn Trp Leu Arg Gln Thr Ile Ser Ala Phe Val Lys Thr Gln Ser
 355 360 365

Ala Trp Asn Ser Asp Ser Glu Lys Pro Phe Asp Asp His Leu Gln Lys
 370 375 380

Gly Ala Leu Leu Tyr Ser Asn Asn Ser Lys Leu Thr Ser Gln Ala Asn
 385 390 395 400

Ser Asn Tyr Arg Ile Leu Asn Arg Thr Pro Thr Asn Gln Thr Gly Lys
 405 410 415

Lys Asp Pro Arg Tyr Thr Ala Asp Arg Thr Ile Gly Gly Tyr Glu Phe
 420 425 430

Leu Leu Ala Asn Asp Val Asp Asn Ser Asn Pro Val Val Gln Ala Glu
 435 440 445

Gln Leu Asn Trp Leu His Phe Leu Met Asn Phe Gly Asn Ile Tyr Ala
 450 455 460

Asn Asp Pro Asp Ala Asn Phe Asp Ser Ile Arg Val Asp Ala Val Asp
 465 470 475 480

Asn Val Asp Ala Asp Leu Leu Gln Ile Ala Gly Asp Tyr Leu Lys Ala
 485 490 495

Ala Lys Gly Ile His Lys Asn Asp Lys Ala Ala Asn Asp His Leu Ser
 500 505 510

Ile Leu Glu Ala Trp Ser Tyr Asn Asp Thr Pro Tyr Leu His Asp Asp
 515 520 525

Gly Asp Asn Met Ile Asn Met Asp Asn Arg Leu Arg Leu Ser Leu Leu
 530 535 540

Tyr Ser Leu Ala Lys Pro Leu Asn Gln Arg Ser Gly Met Asn Pro Leu
 545 550 555 560

Ile Thr Asn Ser Leu Val Asn Arg Thr Asp Asp Asn Ala Glu Thr Ala
 565 570 575

Ala Val Pro Ser Tyr Ser Phe Ile Arg Ala His Asp Ser Glu Val Gln
 580 585 590

Asp Leu Ile Arg Asn Ile Ile Arg Thr Glu Ile Asn Pro Asn Val Val
 595 600 605

Gly Tyr Ser Phe Thr Thr Glu Glu Ile Lys Lys Ala Phe Glu Ile Tyr

610		615		620													
Asn Lys Asp Leu Leu Ala Thr Glu Lys Lys Tyr Thr His Tyr Asn Thr																	
625		630						635								640	
Ala Leu Ser Tyr Ala Leu Leu Leu Thr Asn Lys Ser Ser Val Pro Arg																	
		645						650								655	
Val Tyr Tyr Gly Asp Met Phe Thr Asp Asp Gly Gln Tyr Met Ala His																	
		660						665								670	
Lys Thr Ile Asn Tyr Glu Ala Ile Glu Thr Leu Leu Lys Ala Arg Ile																	
		675						680								685	
Lys Tyr Val Ser Gly Gly Gln Ala Met Arg Asn Gln Gln Val Gly Asn																	
		690						695								700	
Ser Glu Ile Ile Thr Ser Val Arg Tyr Gly Lys Gly Ala Leu Lys Ala																	
705						710					715						720
Thr Asp Thr Gly Asp Arg Thr Thr Arg Thr Ser Gly Val Ala Val Ile																	
				725						730							735
Glu Gly Asn Asn Pro Ser Leu Arg Leu Lys Ala Ser Asp Arg Val Val																	
				740						745							750
Val Asn Met Gly Ala Ala His Lys Asn Gln Ala Tyr Arg Pro Leu Leu																	
		755															
Leu Thr Thr Asp Asn Gly Ile Lys Ala Tyr His Ser Asp Gln Glu Ala																	
		770															
Ala Gly Leu Val Arg Tyr Thr Asn Asp Arg Gly Glu Leu Ile Phe Thr																	
785																	800
Ala Ala Asp Ile Lys Gly Tyr Ala Asn Pro Gln Val Ser Gly Tyr Leu																	
				805													815
Gly Val Trp Val Pro Val Gly Ala Ala Ala Asp Gln Asp Val Arg Val																	
				820													830
Ala Ala Ser Thr Ala Pro Ser Thr Asp Gly Lys Ser Val His Gln Asn																	
		835															845

Ala Ala Leu Asp Ser Arg Val Met Phe Glu Gly Phe Ser Asn Phe Gln
 850 855 860

Ala Phe Ala Thr Lys Lys Glu Glu Tyr Thr Asn Val Val Ile Ala Lys
 865 870 875 880

Asn Val Asp Lys Phe Ala Glu Trp Gly Val Thr Asp Phe Glu Met Ala
 885 890 895

Pro Gln Tyr Val Ser Ser Thr Asp Gly Ser Phe Leu Asp Ser Val Ile
 900 905 910

Gln Asn Gly Tyr Ala Phe Thr Asp Arg Tyr Asp Leu Gly Ile Ser Lys
 915 920 925

Pro Asn Lys Tyr Gly Thr Ala Asp Asp Leu Val Lys Ala Ile Lys Ala
 930 935 940

Leu His Ser Lys Gly Ile Lys Val Met Ala Asp Trp Val Pro Asp Gln
 945 950 955 960

Met Tyr Ala Leu Pro Glu Lys Glu Val Val Thr Ala Thr Arg Val Asp
 965 970 975

Lys Tyr Gly Thr Pro Val Ala Gly Ser Gln Ile Lys Asn Thr Leu Tyr
 980 985 990

Val Val Asp Gly Lys Ser Ser Gly Lys Asp Gln Gln Ala Lys Tyr Gly
 995 1000 1005

Gly Ala Phe Leu Glu Glu Leu Gln Ala Lys Tyr Pro Glu Leu Phe
 1010 1015 1020

Ala Arg Lys Gln Ile Ser Thr Gly Val Pro Met Asp Pro Ser Val
 1025 1030 1035

Lys Ile Lys Gln Trp Ser Ala Lys Tyr Phe Asn Gly Thr Asn Ile
 1040 1045 1050

Leu Gly Arg Gly Ala Gly Tyr Val Leu Lys Asp Gln Ala Thr Asn
 1055 1060 1065

Thr	Tyr	Phe	Ser	Leu	Val	Ser	Asp	Asn	Thr	Phe	Leu	Pro	Lys	Ser
1070						1075					1080			
Leu	Val	Asn	Pro	Asn	His	Gly	Thr	Ser	Ser	Ser	Val	Thr	Gly	Leu
1085						1090					1095			
Val	Phe	Asp	Gly	Lys	Gly	Tyr	Val	Tyr	Tyr	Ser	Thr	Ser	Gly	Asn
1100						1105					1110			
Gln	Ala	Lys	Asn	Ala	Phe	Ile	Ser	Leu	Gly	Asn	Asn	Trp	Tyr	Tyr
1115						1120					1125			
Phe	Asp	Asn	Asn	Gly	Tyr	Met	Val	Thr	Gly	Ala	Gln	Ser	Ile	Asn
1130						1135					1140			
Gly	Ala	Asn	Tyr	Tyr	Phe	Leu	Ser	Asn	Gly	Ile	Gln	Leu	Arg	Asn
1145						1150					1155			
Ala	Ile	Tyr	Asp	Asn	Gly	Asn	Lys	Val	Leu	Ser	Tyr	Tyr	Gly	Asn
1160						1165					1170			
Asp	Gly	Arg	Arg	Tyr	Glu	Asn	Gly	Tyr	Tyr	Leu	Phe	Gly	Gln	Gln
1175						1180					1185			
Trp	Arg	Tyr	Phe	Gln	Asn	Gly	Ile	Met	Ala	Val	Gly	Leu	Thr	Arg
1190						1195					1200			
Val	His	Gly	Ala	Val	Gln	Tyr	Phe	Asp	Ala	Ser	Gly	Phe	Gln	Ala
1205						1210					1215			
Lys	Gly	Gln	Phe	Ile	Thr	Thr	Ala	Asp	Gly	Lys	Leu	Arg	Tyr	Phe
1220						1225					1230			
Asp	Arg	Asp	Ser	Gly	Asn	Gln	Ile	Ser	Asn	Arg	Phe	Val	Arg	Asn
1235						1240					1245			
Ser	Lys	Gly	Glu	Trp	Phe	Leu	Phe	Asp	His	Asn	Gly	Val	Ala	Val
1250						1255					1260			
Thr	Gly	Thr	Val	Thr	Phe	Asn	Gly	Gln	Arg	Leu	Tyr	Phe	Lys	Pro
1265						1270					1275			

Asn Gly Val Gln Ala Lys Gly Glu Phe Ile Arg Asp Ala Asn Gly
 1280 1285 1290

Tyr Leu Arg Tyr Tyr Asp Pro Asn Ser Gly Asn Glu Val Arg Asn
 1295 1300 1305

Arg Phe Val Arg Asn Ser Lys Gly Glu Trp Phe Leu Phe Asp His
 1310 1315 1320

Asn Gly Ile Ala Val Thr Gly Ala Arg Val Val Asn Gly His Ala
 1325 1330 1335

Ser Ile Leu Ser Leu Met Val Phe Arg Leu Arg Glu Ser Ser Leu
 1340 1345 1350

Gln Ser Val Lys Val Val Ser Asn Thr Met Ile Leu Ile Pro Glu
 1355 1360 1365

Met Lys Phe Val Ile Val Met
 1370 1375

<210> 36
 <211> 1430
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 <213> Streptococcus mutans

<400> 36

Met Glu Thr Lys Arg Arg Tyr Lys Met His Lys Val Lys Lys His Trp
 1 5 10 15

Val Thr Val Ala Val Ala Ser Gly Leu Ile Thr Leu Gly Thr Thr Thr
 20 25 30

Leu Gly Ser Ser Val Ser Ala Glu Thr Glu Gln Gln Thr Ser Asp Lys
 35 40 45

Val Val Thr Gln Lys Ser Glu Asp Asp Lys Ala Ala Ser Glu Ser Ser
 50 55 60

Gln Thr Asp Ala Pro Lys Thr Lys Gln Ala Gln Thr Glu Gln Thr Gln
 65 70 75 80

Ala Gln Ser Gln Ala Asn Val Ala Asp Thr Ser Thr Ser Ile Thr Lys
 85 90 95

Glu	Thr	Pro	Ser	Gln	Asn	Ile	Thr	Thr	Gln	Ala	Asn	Ser	Asp	Asp	Lys	100	105	110
Thr	Val	Thr	Asn	Thr	Lys	Ser	Glu	Glu	Ala	Gln	Thr	Ser	Glu	Glu	Arg	115	120	125
Thr	Lys	Gln	Ser	Glu	Glu	Ala	Gln	Thr	Thr	Ala	Ser	Ser	Gln	Ala	Leu	130	135	140
Thr	Gln	Ala	Lys	Ala	Glu	Leu	Thr	Lys	Gln	Arg	Gln	Thr	Ala	Ala	Gln	145	150	155 160
Glu	Asn	Lys	Asn	Pro	Val	Asp	Leu	Ala	Ala	Ile	Pro	Asn	Val	Lys	Gln	165	170	175
Ile	Asp	Gly	Lys	Tyr	Tyr	Tyr	Ile	Gly	Ser	Asp	Gly	Gln	Pro	Lys	Lys	180	185	190
Asn	Phe	Ala	Leu	Thr	Val	Asn	Asn	Lys	Val	Leu	Tyr	Phe	Asp	Lys	Asn	195	200	205
Thr	Gly	Ala	Leu	Thr	Asp	Thr	Ser	Gln	Tyr	Gln	Phe	Lys	Gln	Gly	Leu	210	215	220
Thr	Lys	Leu	Asn	Asn	Asp	Tyr	Thr	Pro	His	Asn	Gln	Ile	Val	Asn	Phe	225	230	235 240
Glu	Asn	Thr	Ser	Leu	Glu	Thr	Ile	Asp	Asn	Tyr	Val	Thr	Ala	Asp	Ser	245	250	255
Trp	Tyr	Arg	Pro	Lys	Asp	Ile	Leu	Lys	Asn	Gly	Lys	Thr	Trp	Thr	Ala	260	265	270
Ser	Ser	Glu	Ser	Asp	Leu	Arg	Pro	Leu	Leu	Met	Ser	Trp	Trp	Pro	Asp	275	280	285
Lys	Gln	Thr	Gln	Ile	Ala	Tyr	Leu	Asn	Tyr	Met	Asn	Gln	Gln	Gly	Leu	290	295	300
Gly	Thr	Gly	Glu	Asn	Tyr	Thr	Ala	Asp	Ser	Ser	Gln	Glu	Ser	Leu	Asn	305	310	315 320

Leu Ala Ala Gln Thr Val Gln Val Lys Ile Glu Thr Lys Ile Ser Gln
325 330 335

Thr Gln Gln Thr Gln Trp Leu Arg Asp Ile Ile Asn Ser Phe Val Lys
340 345 350

Thr Gln Pro Asn Trp Asn Ser Gln Thr Glu Ser Asp Thr Ser Ala Gly
355 360 365

Glu Lys Asp His Leu Gln Gly Gly Ala Leu Leu Tyr Ser Asn Ser Asp
370 375 380

Lys Thr Ala Tyr Ala Asn Ser Asp Tyr Arg Leu Leu Asn Arg Thr Pro
385 390 395 400

Thr Ser Gln Thr Gly Lys Pro Lys Tyr Phe Glu Asp Asn Ser Ser Gly
405 410 415

Gly Tyr Asp Phe Leu Leu Ala Asn Asp Ile Asp Asn Ser Asn Pro Val
420 425 430

Val Gln Ala Glu Gln Leu Asn Trp Leu His Tyr Leu Met Asn Tyr Gly
435 440 445

Ser Ile Val Ala Asn Asp Pro Glu Ala Asn Phe Asp Gly Val Arg Val
450 455 460

Asp Ala Val Asp Asn Val Asn Ala Asp Leu Leu Gln Ile Ala Ser Asp
465 470 475 480

Tyr Leu Lys Ala His Tyr Gly Val Asp Lys Ser Glu Lys Asn Ala Ile
485 490 495

Asn His Leu Ser Ile Leu Glu Ala Trp Ser Asp Asn Asp Pro Gln Tyr
500 505 510

Asn Lys Asp Thr Lys Gly Ala Gln Leu Pro Ile Asp Asn Lys Leu Arg
515 520 525

Leu Ser Leu Leu Tyr Ala Leu Thr Arg Pro Leu Glu Lys Asp Ala Ser
530 535 540

Asn Lys Asn Glu Ile Arg Ser Gly Leu Glu Pro Val Ile Thr Asn Ser
 545 550 555 560

Leu Asn Asn Arg Ser Ala Glu Gly Lys Asn Ser Glu Arg Met Ala Asn
 565 570 575

Tyr Ile Phe Ile Arg Ala His Asp Ser Glu Val Gln Thr Val Ile Ala
 580 585 590

Lys Ile Ile Lys Ala Gln Ile Asn Pro Lys Thr Asp Gly Leu Thr Phe
 595 600 605

Thr Leu Asp Glu Leu Lys Gln Ala Phe Lys Ile Tyr Asn Glu Asp Met
 610 615 620

Arg Gln Ala Lys Lys Lys Tyr Thr Gln Ser Asn Ile Pro Thr Ala Tyr
 625 630 635 640

Ala Leu Met Leu Ser Asn Lys Asp Ser Ile Thr Arg Leu Tyr Tyr Gly
 645 650 655

Asp Met Tyr Ser Asp Asp Gly Gln Tyr Met Ala Thr Lys Ser Pro Tyr
 660 665 670

Tyr Asp Ala Ile Asp Thr Leu Leu Lys Ala Arg Ile Lys Tyr Ala Ala
 675 680 685

Gly Gly Gln Asp Met Lys Ile Thr Tyr Val Glu Gly Asp Lys Ser His
 690 695 700

Met Asp Trp Asp Tyr Thr Gly Val Leu Thr Ser Val Arg Tyr Gly Thr
 705 710 715 720

Gly Ala Asn Glu Ala Thr Asp Gln Gly Ser Glu Ala Thr Lys Thr Gln
 725 730 735

Gly Met Ala Val Ile Thr Ser Asn Asn Pro Ser Leu Lys Leu Asn Gln
 740 745 750

Asn Asp Lys Val Ile Val Asn Met Gly Ala Ala His Lys Asn Gln Glu
 755 760 765

Tyr Arg Pro Leu Leu Leu Thr Thr Lys Asp Gly Leu Thr Ser Tyr Thr

		770				775										780			
Ser	Asp	Ala	Ala	Ala	Lys	Ser	Leu	Tyr	Arg	Lys	Thr	Asn	Asp	Lys	Gly				
785					790					795					800				
Glu	Leu	Val	Phe	Asp	Ala	Ser	Asp	Ile	Gln	Gly	Tyr	Leu	Asn	Pro	Gln				
				805					810					815					
Val	Ser	Gly	Tyr	Leu	Ala	Val	Trp	Val	Pro	Val	Gly	Ala	Ser	Asp	Asn				
			820					825					830						
Gln	Asp	Val	Arg	Val	Ala	Ala	Ser	Asn	Lys	Ala	Asn	Ala	Thr	Gly	Gln				
		835					840					845							
Val	Tyr	Glu	Ser	Ser	Ser	Ala	Leu	Asp	Ser	Gln	Leu	Ile	Tyr	Glu	Gly				
	850					855					860								
Phe	Ser	Asn	Phe	Gln	Asp	Phe	Val	Thr	Lys	Asp	Ser	Asp	Tyr	Thr	Asn				
865					870					875					880				
Lys	Lys	Ile	Ala	Gln	Asn	Val	Gln	Leu	Phe	Lys	Ser	Trp	Gly	Val	Thr				
				885					890					895					
Ser	Phe	Glu	Met	Ala	Pro	Gln	Tyr	Val	Ser	Ser	Glu	Asp	Gly	Ser	Phe				
			900					905					910						
Leu	Asp	Ser	Ile	Ile	Gln	Asn	Gly	Tyr	Ala	Phe	Glu	Asp	Arg	Tyr	Asp				
		915					920					925							
Leu	Ala	Met	Ser	Lys	Asn	Asn	Lys	Tyr	Gly	Ser	Gln	Gln	Asp	Met	Ile				
	930					935					940								
Asn	Ala	Val	Lys	Ala	Leu	His	Lys	Ser	Gly	Ile	Gln	Val	Ile	Ala	Asp				
945					950					955					960				
Trp	Val	Pro	Asp	Gln	Ile	Tyr	Asn	Leu	Pro	Gly	Lys	Glu	Val	Val	Thr				
				965					970						975				
Ala	Thr	Arg	Val	Asn	Asp	Tyr	Gly	Glu	Tyr	Arg	Lys	Asp	Ser	Glu	Ile				
			980					985					990						
Lys	Asn	Thr	Leu	Tyr	Ala	Ala	Asn	Thr	Lys	Ser	Asn	Gly	Lys	Asp	Tyr				
		995					1000					1005							

Gln	Ala	Lys	Tyr	Gly	Gly	Ala	Phe	Leu	Ser	Glu	Leu	Ala	Ala	Lys
1010						1015					1020			
Tyr	Pro	Ser	Ile	Phe	Asn	Arg	Thr	Gln	Ile	Ser	Asn	Gly	Lys	Lys
1025						1030					1035			
Ile	Asp	Pro	Ser	Glu	Lys	Ile	Thr	Ala	Trp	Lys	Ala	Lys	Tyr	Phe
1040						1045					1050			
Asn	Gly	Thr	Asn	Ile	Leu	Gly	Arg	Gly	Val	Gly	Tyr	Val	Leu	Lys
1055						1060					1065			
Asp	Asn	Ala	Ser	Asp	Lys	Tyr	Phe	Glu	Leu	Lys	Gly	Asn	Gln	Thr
1070						1075					1080			
Tyr	Leu	Pro	Lys	Gln	Met	Thr	Asn	Lys	Glu	Ala	Ser	Thr	Gly	Phe
1085						1090					1095			
Val	Asn	Asp	Gly	Asn	Gly	Met	Thr	Phe	Tyr	Ser	Thr	Ser	Gly	Tyr
1100						1105					1110			
Gln	Ala	Lys	Asn	Ser	Phe	Val	Gln	Asp	Ala	Lys	Gly	Asn	Trp	Tyr
1115						1120					1125			
Tyr	Phe	Asp	Asn	Asn	Gly	His	Met	Val	Tyr	Gly	Leu	Gln	Gln	Leu
1130						1135					1140			
Asn	Gly	Glu	Val	Gln	Tyr	Phe	Leu	Ser	Asn	Gly	Val	Gln	Leu	Arg
1145						1150					1155			
Glu	Ser	Phe	Leu	Glu	Asn	Ala	Asp	Gly	Ser	Lys	Asn	Tyr	Phe	Gly
1160						1165					1170			
His	Leu	Gly	Asn	Arg	Tyr	Ser	Asn	Gly	Tyr	Tyr	Ser	Phe	Asp	Asn
1175						1180					1185			
Asp	Ser	Lys	Trp	Arg	Tyr	Phe	Asp	Ala	Ser	Gly	Val	Met	Ala	Val
1190						1195					1200			
Gly	Leu	Lys	Thr	Ile	Asn	Gly	Asn	Thr	Gln	Tyr	Phe	Asp	Gln	Asp
1205						1210					1215			

Gly Tyr Gln Val Lys Gly Ala Trp Ile Thr Gly Ser Asp Gly Lys	1220	1225	1230
Lys Arg Tyr Phe Asp Asp Gly Ser Gly Asn Met Ala Val Asn Arg	1235	1240	1245
Phe Ala Asn Asp Lys Asn Gly Asp Trp Tyr Tyr Leu Asn Ser Asp	1250	1255	1260
Gly Ile Ala Leu Val Gly Val Gln Thr Ile Asn Gly Lys Thr Tyr	1265	1270	1275
Tyr Phe Gly Gln Asp Gly Lys Gln Ile Lys Gly Lys Ile Ile Thr	1280	1285	1290
Asp Asn Gly Lys Leu Lys Tyr Phe Leu Ala Asn Ser Gly Glu Leu	1295	1300	1305
Ala Arg Asn Ile Phe Ala Thr Asp Ser Gln Asn Asn Trp Tyr Tyr	1310	1315	1320
Phe Gly Ser Asp Gly Val Ala Val Thr Gly Ser Gln Thr Ile Ala	1325	1330	1335
Gly Lys Lys Leu Tyr Phe Ala Ser Asp Gly Lys Gln Val Lys Gly	1340	1345	1350
Ser Phe Val Thr Tyr Asn Gly Lys Val His Tyr Tyr His Ala Asp	1355	1360	1365
Ser Gly Glu Leu Gln Val Asn Arg Phe Glu Ala Asp Lys Asp Gly	1370	1375	1380
Asn Trp Tyr Tyr Leu Asp Ser Asn Gly Glu Ala Leu Thr Gly Ser	1385	1390	1395
Gln Arg Ile Asn Asp Gln Arg Val Phe Phe Thr Arg Glu Gly Lys	1400	1405	1410
Gln Val Lys Gly Asp Val Ala Tyr Asp Glu Arg Arg Leu Leu Val	1415	1420	1425

Tyr Arg
1430

<210> 37
<211> 1590
<212> PRT
<213> Streptococcus sobrinus

<400> 37

Met Glu Lys Asn Val Arg Phe Lys Met His Lys Val Lys Lys Arg Trp
1 5 10 15

Val Thr Leu Ser Val Ala Ser Ala Thr Met Leu Ala Ser Ala Leu Gly
20 25 30

Ala Ser Val Ala Ser Ala Asp Thr Asp Thr Ala Ser Asp Asp Ser Asn
35 40 45

Gln Ala Val Val Thr Gly Asp Gln Thr Thr Asn Asn Gln Ala Thr Asp
50 55 60

Gln Thr Ser Ile Ala Ala Thr Ala Thr Ser Glu Gln Ser Ala Ser Thr
65 70 75 80

Asp Ala Ala Thr Asp Gln Ala Ser Ala Ala Glu Gln Thr Gln Gly Thr
85 90 95

Thr Ala Ser Thr Asp Thr Ala Ala Gln Thr Thr Thr Asn Ala Asn Glu
100 105 110

Ala Lys Trp Val Pro Thr Glu Asn Glu Asn Gln Gly Phe Thr Asp Glu
115 120 125

Met Leu Ala Glu Ala Lys Asn Val Ala Thr Ala Glu Ser Asp Ser Ile
130 135 140

Pro Ser Asp Leu Ala Lys Met Ser Asn Val Lys Gln Val Asp Gly Lys
145 150 155 160

Tyr Tyr Tyr Tyr Asp Gln Asp Gly Asn Val Lys Lys Asn Phe Ala Val
165 170 175

Ser Val Gly Asp Lys Ile Tyr Tyr Phe Asp Glu Thr Gly Ala Tyr Lys
180 185 190

Asp	Thr	Ser	Lys	Val	Asp	Ala	Asp	Lys	Ser	Ser	Ser	Ala	Val	Ser	Gln	195	200	205	
Asn	Ala	Thr	Ile	Phe	Ala	Ala	Asn	Asn	Arg	Ala	Tyr	Ser	Thr	Ser	Ala	210	215	220	
Lys	Asn	Phe	Glu	Ala	Val	Asp	Asn	Tyr	Leu	Thr	Ala	Asp	Ser	Trp	Tyr	225	230	235	240
Arg	Pro	Lys	Ser	Ile	Leu	Lys	Asp	Gly	Lys	Thr	Trp	Thr	Glu	Ser	Gly	245	250	255	
Lys	Asp	Asp	Phe	Arg	Pro	Leu	Leu	Met	Ala	Trp	Trp	Pro	Asp	Thr	Glu	260	265	270	
Thr	Lys	Arg	Asn	Tyr	Val	Asn	Tyr	Met	Asn	Lys	Val	Val	Gly	Ile	Asp	275	280	285	
Lys	Thr	Tyr	Thr	Ala	Glu	Thr	Ser	Gln	Ala	Asp	Leu	Thr	Ala	Ala	Ala	290	295	300	
Glu	Leu	Val	Gln	Ala	Arg	Ile	Glu	Gln	Lys	Ile	Thr	Ser	Glu	Asn	Asn	305	310	315	320
Thr	Lys	Trp	Leu	Arg	Glu	Ala	Ile	Ser	Ala	Phe	Val	Lys	Thr	Gln	Pro	325	330	335	
Gln	Trp	Asn	Gly	Glu	Ser	Glu	Lys	Pro	Tyr	Asp	Asp	His	Leu	Gln	Asn	340	345	350	
Gly	Ala	Leu	Leu	Phe	Asp	Asn	Gln	Thr	Asp	Leu	Thr	Pro	Asp	Thr	Gln	355	360	365	
Ser	Asn	Tyr	Arg	Leu	Leu	Asn	Arg	Thr	Pro	Thr	Asn	Gln	Thr	Gly	Ser	370	375	380	
Leu	Asp	Ser	Arg	Phe	Thr	Tyr	Asn	Pro	Asn	Asp	Pro	Leu	Gly	Gly	Tyr	385	390	395	400
Asp	Phe	Leu	Leu	Ala	Asn	Asp	Val	Asp	Asn	Ser	Asn	Pro	Val	Val	Gln	405	410	415	

Ala Glu Gln Leu Asn Trp Leu His Tyr Leu Leu Asn Phe Gly Ser Ile
 420 425 430

Tyr Ala Asn Asp Ala Asp Ala Asn Phe Asp Ser Ile Arg Val Asp Ala
 435 440 445

Val Asp Asn Val Asp Ala Asp Leu Leu Gln Ile Ser Ser Asp Tyr Leu
 450 455 460

Lys Ala Ala Tyr Gly Ile Asp Lys Asn Asn Lys Asn Ala Asn Asn His
 465 470 475 480

Val Ser Ile Val Glu Ala Trp Ser Asp Asn Asp Thr Pro Tyr Leu His
 485 490 495

Asp Asp Gly Asp Asn Leu Met Asn Met Asp Asn Lys Phe Arg Leu Ser
 500 505 510

Met Leu Trp Ser Leu Ala Lys Pro Leu Asp Lys Arg Ser Gly Leu Asn
 515 520 525

Pro Leu Ile His Asn Ser Leu Val Asp Arg Glu Val Asp Asp Arg Glu
 530 535 540

Val Glu Thr Val Pro Ser Tyr Ser Phe Ala Arg Ala His Asp Ser Glu
 545 550 555 560

Val Gln Asp Ile Ile Arg Asp Ile Ile Lys Ala Glu Ile Asn Pro Asn
 565 570 575

Ser Phe Gly Tyr Ser Phe Thr Gln Glu Glu Ile Glu Gln Ala Phe Lys
 580 585 590

Ile Tyr Asn Glu Asp Leu Lys Lys Thr Asp Lys Lys Tyr Thr His Tyr
 595 600 605

Asn Val Pro Leu Ser Tyr Thr Leu Leu Leu Thr Asn Lys Gly Ser Ile
 610 615 620

Pro Arg Val Tyr Tyr Gly Asp Met Phe Thr Asp Asp Gly Gln Tyr Met
 625 630 635 640

Ala Asn Lys Thr Val Asn Tyr Asp Ala Ile Glu Ser Leu Leu Lys Ala
 645 650 655

Arg Met Lys Tyr Val Ser Gly Gly Gln Ala Met Gln Asn Tyr Gln Ile
 660 665 670

Gly Asn Gly Glu Ile Leu Thr Ser Val Arg Tyr Gly Lys Gly Ala Leu
 675 680 685

Lys Gln Ser Asp Lys Gly Asp Ala Thr Thr Arg Thr Ser Gly Val Gly
 690 695 700

Val Val Met Gly Asn Gln Pro Asn Phe Ser Leu Asp Gly Lys Val Val
 705 710 715 720

Ala Leu Asn Met Gly Ala Ala His Ala Asn Gln Glu Tyr Arg Ala Leu
 725 730 735

Met Val Ser Thr Lys Asp Gly Val Ala Thr Tyr Ala Thr Asp Ala Asp
 740 745 750

Ala Ser Lys Ala Gly Leu Val Lys Arg Thr Asp Glu Asn Gly Tyr Leu
 755 760 765

Tyr Phe Leu Asn Asp Asp Leu Lys Gly Val Ala Asn Pro Gln Val Ser
 770 775 780

Gly Phe Leu Gln Val Trp Val Pro Val Gly Ala Ala Asp Asp Gln Asp
 785 790 795 800

Ile Arg Val Ala Ala Ser Asp Thr Ala Ser Thr Asp Gly Lys Ser Leu
 805 810 815

His Gln Asp Ala Ala Met Asp Ser Arg Val Met Phe Glu Gly Phe Ser
 820 825 830

Asn Phe Gln Ser Phe Ala Thr Lys Glu Glu Glu Tyr Thr Asn Val Val
 835 840 845

Ile Ala Asn Asn Val Asp Lys Phe Val Ser Trp Gly Ile Thr Asp Phe
 850 855 860

Glu Met Ala Pro Gln Tyr Val Ser Ser Thr Asp Gly Gln Phe Leu Asp

865		870		875		880
Ser Val Ile Gln Asn Gly Tyr Ala Phe Thr Asp Arg Tyr Asp Leu Gly						
	885			890		895
Met Ser Lys Ala Asn Lys Tyr Gly Thr Ala Asp Gln Leu Val Lys Ala						
	900			905		910
Ile Lys Ala Leu His Ala Lys Gly Leu Lys Val Met Ala Asp Trp Val						
	915			920		925
Pro Asp Gln Met Tyr Thr Phe Pro Lys Gln Glu Val Val Thr Val Thr						
	930			935		940
Arg Thr Asp Lys Phe Gly Lys Pro Ile Ala Gly Ser Gln Ile Asn His						
	945			950		955
						960
Ser Leu Tyr Val Thr Asp Thr Lys Ser Ser Gly Asp Asp Tyr Gln Ala						
				965		970
						975
Lys Tyr Gly Gly Ala Phe Leu Asp Glu Leu Lys Glu Lys Tyr Pro Glu						
	980			985		990
Leu Phe Thr Lys Lys Gln Ile Ser Thr Gly Gln Ala Ile Asp Pro Ser						
	995			1000		1005
Val Lys Ile Lys Gln Trp Ser Ala Lys Tyr Phe Asn Gly Ser Asn						
	1010			1015		1020
Ile Leu Gly Arg Gly Ala Asp Tyr Val Leu Ser Asp Gln Val Ser						
	1025			1030		1035
Asn Lys Tyr Phe Asn Val Ala Ser Asp Thr Leu Phe Leu Pro Ser						
	1040			1045		1050
Ser Leu Leu Gly Lys Val Val Glu Ser Gly Ile Arg Tyr Asp Gly						
	1055			1060		1065
Lys Gly Tyr Ile Tyr Asn Ser Ser Ala Thr Gly Asp Gln Val Lys						
	1070			1075		1080
Ala Ser Phe Ile Thr Glu Ala Gly Asn Leu Tyr Tyr Phe Gly Lys						
	1085			1090		1095

Asp Gly Tyr Met Val Thr Gly Ala Gln Thr Ile Asn Gly Ala Asn 1100 1105 1110
Tyr Phe Phe Leu Glu Asn Gly Thr Ala Leu Arg Asn Thr Ile Tyr 1115 1120 1125
Thr Asp Ala Gln Gly Asn Ser His Tyr Tyr Ala Asn Asp Gly Lys 1130 1135 1140
Arg Tyr Glu Asn Gly Tyr Gln Gln Phe Gly Asn Asp Trp Arg Tyr 1145 1150 1155
Phe Lys Asp Gly Asn Met Ala Val Gly Leu Thr Thr Val Asp Gly 1160 1165 1170
Asn Val Gln Tyr Phe Asp Lys Asp Gly Val Gln Ala Lys Asp Lys 1175 1180 1185
Ile Ile Val Thr Arg Asp Gly Lys Val Arg Tyr Phe Asp Gln His 1190 1195 1200
Asn Gly Asn Ala Ala Thr Asn Thr Phe Ile Ala Asp Lys Thr Gly 1205 1210 1215
His Trp Tyr Tyr Leu Gly Lys Asp Gly Val Ala Val Thr Gly Ala 1220 1225 1230
Gln Thr Val Gly Lys Gln Lys Leu Tyr Phe Glu Ala Asn Gly Gln 1235 1240 1245
Gln Val Lys Gly Asp Phe Val Thr Ser Asp Glu Gly Lys Leu Tyr 1250 1255 1260
Phe Tyr Asp Val Asp Ser Gly Asp Met Trp Thr Asp Thr Phe Ile 1265 1270 1275
Glu Asp Lys Ala Gly Asn Trp Phe Tyr Leu Gly Lys Asp Gly Ala 1280 1285 1290
Ala Val Thr Gly Ala Gln Thr Ile Arg Gly Gln Lys Leu Tyr Phe 1295 1300 1305

Lys	Ala	Asn	Gly	Gln	Gln	Val	Lys	Gly	Asp	Ile	Val	Lys	Gly	Thr
1310						1315					1320			
Asp	Gly	Lys	Ile	Arg	Tyr	Tyr	Asp	Ala	Lys	Ser	Gly	Glu	Gln	Val
1325						1330					1335			
Phe	Asn	Lys	Thr	Val	Lys	Ala	Ala	Asp	Gly	Lys	Thr	Tyr	Val	Ile
1340						1345					1350			
Gly	Asn	Asp	Gly	Val	Ala	Val	Asp	Pro	Ser	Val	Val	Lys	Gly	Gln
1355						1360					1365			
Thr	Phe	Lys	Asp	Ala	Ser	Gly	Ala	Leu	Arg	Phe	Tyr	Asn	Leu	Lys
1370						1375					1380			
Gly	Gln	Leu	Val	Thr	Gly	Ser	Gly	Trp	Tyr	Glu	Thr	Ala	Asn	His
1385						1390					1395			
Asp	Trp	Val	Tyr	Ile	Gln	Ser	Gly	Lys	Ala	Leu	Thr	Gly	Glu	Gln
1400						1405					1410			
Thr	Ile	Asn	Gly	Gln	His	Leu	Tyr	Phe	Lys	Glu	Asp	Gly	His	Gln
1415						1420					1425			
Val	Lys	Gly	Gln	Leu	Val	Thr	Gly	Thr	Asp	Gly	Lys	Val	Arg	Tyr
1430						1435					1440			
Tyr	Asp	Ala	Asn	Ser	Gly	Asp	Gln	Ala	Phe	Asn	Lys	Ser	Val	Thr
1445						1450					1455			
Val	Asn	Gly	Lys	Thr	Tyr	Tyr	Phe	Gly	Asn	Asp	Gly	Thr	Ala	Gln
1460						1465					1470			
Thr	Ala	Gly	Asn	Pro	Lys	Gly	Gln	Thr	Phe	Lys	Asp	Gly	Ser	Asp
1475						1480					1485			
Ile	Arg	Phe	Tyr	Ser	Met	Glu	Gly	Gln	Leu	Val	Thr	Gly	Ser	Gly
1490						1495					1500			
Trp	Tyr	Glu	Asn	Ala	Gln	Gly	Gln	Trp	Leu	Tyr	Val	Lys	Asn	Gly
1505						1510					1515			

Lys Val Leu Thr Gly Leu Gln Thr Val Gly Ser Gln Arg Val Tyr
 1520 1525 1530

Phe Asp Glu Asn Gly Ile Gln Ala Lys Gly Lys Ala Val Arg Thr
 1535 1540 1545

Ser Asp Gly Lys Ile Arg Tyr Phe Asp Glu Asn Ser Gly Ser Met
 1550 1555 1560

Ile Thr Asn Gln Trp Lys Phe Val Tyr Gly Gln Tyr Tyr Tyr Phe
 1565 1570 1575

Gly Asn Asp Gly Ala Arg Ile Tyr Arg Gly Trp Asn
 1580 1585 1590

<210> 38
 <211> 1554
 <212> PRT
 <213> Streptococcus sobrinus

<400> 38

Met Glu Lys Lys Leu His Tyr Lys Leu His Lys Val Lys Lys His Trp
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Val Thr Ile Ala Val Ala Ser Ile Gly Leu Val Ser Leu Val Gly Ala
 20 25 30

Gly Thr Val Ser Ala Glu Asp Lys Val Ala Asn Asp Thr Thr Ala Gln
 35 40 45

Ala Thr Val Gly Val Asp Thr Gly Gln Asp Gln Ala Thr Thr Asn Asp
 50 55 60

Ala Asn Thr Asn Thr Thr Asp Thr Asp Thr Ala Asp Gln Ser Ala Asn
 65 70 75 80

Thr Asn Gln Asp Gln Ala Gly Ser Asp Gln Ser Asn Asn Gln Asp Gln
 85 90 95

Ala Lys Gln Asp Thr Ala Asn Thr Asp Arg Asn Gln Ala Asp Asn Ser
 100 105 110

Gln Thr Asp Asn Asn Gln Ala Thr Asp Gln Ala Thr Ser Pro Ala Thr
 115 120 125

Asp	Gly	Thr	Ser	Val	Gln	Arg	Arg	Asp	Ala	Ala	Asn	Val	Ala	Thr	Ala	130	135	140	
Ala	Asp	Gln	Glu	Gly	Gln	Thr	Ala	Pro	Ser	Glu	Gln	Glu	Lys	Ser	Ala	145	150	155	160
Ala	Leu	Ser	Leu	Asp	Asn	Val	Lys	Leu	Ile	Asp	Gly	Lys	Tyr	Tyr	Tyr	165	170	175	
Val	Gln	Ala	Asp	Gly	Ser	Tyr	Lys	Lys	Asn	Phe	Ala	Ile	Thr	Val	Asn	180	185	190	
Gly	Gln	Met	Leu	Tyr	Phe	Asp	Ser	Asp	Thr	Gly	Ala	Leu	Ser	Ser	Thr	195	200	205	
Ser	Thr	Tyr	Ser	Phe	Ser	Gln	Gly	Thr	Thr	Asn	Leu	Val	Asp	Asp	Phe	210	215	220	
Ser	Ser	His	Asn	Lys	Ala	Tyr	Asp	Ser	Thr	Ala	Lys	Ser	Phe	Glu	Leu	225	230	235	240
Val	Asn	Gly	Tyr	Leu	Thr	Ala	Asn	Ser	Trp	Tyr	Arg	Pro	Ala	Gly	Ile	245	250	255	
Leu	Arg	Asn	Gly	Gln	Thr	Trp	Glu	Ala	Ser	Asn	Glu	Asn	Asp	Leu	Arg	260	265	270	
Pro	Val	Leu	Met	Ser	Trp	Trp	Pro	Asp	Lys	Asp	Thr	Gln	Val	Ala	Tyr	275	280	285	
Val	Asn	Tyr	Met	Asn	Lys	Tyr	Leu	Ser	Ala	Asn	Glu	Thr	Glu	Val	Thr	290	295	300	
Asn	Glu	Thr	Ser	Gln	Val	Asp	Leu	Asn	Lys	Glu	Ala	Gln	Ser	Ile	Gln	305	310	315	320
Thr	Lys	Ile	Glu	Gln	Lys	Ile	Thr	Ser	Asp	Asn	Ser	Thr	Gln	Trp	Leu	325	330	335	
Arg	Thr	Ala	Met	Glu	Ala	Phe	Val	Ala	Ala	Gln	Pro	Lys	Trp	Asn	Met	340	345	350	

Ser Thr Glu Asn Phe Asn Lys Gly Asp His Leu Gln Gly Gly Ala Leu
 355 360 365

Leu Tyr Thr Asn Ser Asp Leu Thr Pro Trp Ala Asn Ser Asp Tyr Arg
 370 375 380

Leu Leu Asn Arg Thr Pro Thr Gln Gln Asp Gly Thr Lys Lys Tyr Phe
 385 390 395 400

Thr Glu Gly Gly Glu Gly Gly Tyr Glu Phe Leu Leu Ser Asn Asp Val
 405 410 415

Asp Asn Ser Asn Pro Val Val Gln Ala Glu Gln Leu Asn Gln Leu His
 420 425 430

Tyr Leu Met Asn Trp Gly Asp Ile Val Met Gly Asp Lys Asp Ala Asn
 435 440 445

Phe Asp Gly Val Arg Val Asp Ala Val Asp Asn Val Asn Ala Asp Leu
 450 455 460

Leu Gln Val Tyr Ser Asn Tyr Phe Lys Asp Asn Tyr Lys Val Thr Asp
 465 470 475 480

Ser Glu Ala Asn Ala Leu Ala His Ile Ser Ile Leu Glu Ala Trp Ser
 485 490 495

Leu Asn Asp Asn Gln Tyr Asn Glu Asp Thr Asn Gly Thr Ala Leu Ser
 500 505 510

Ile Asp Asn Ser Ser Arg Leu Thr Ser Leu Ala Val Leu Thr Lys Gln
 515 520 525

Pro Gly Gln Arg Ile Asp Leu Ser Asn Leu Ile Ser Glu Ser Val Asn
 530 535 540

Lys Glu Arg Ala Asn Asp Thr Ala Tyr Gly Asp Thr Ile Pro Thr Tyr
 545 550 555 560

Ser Phe Val Arg Ala His Asp Ser Glu Val Gln Thr Val Ile Ala Lys
 565 570 575

Ile Val Lys Glu Lys Ile Asp Thr Asn Ser Asp Gly Tyr Thr Phe Thr
580 585 590

Leu Asp Gln Leu Lys Asp Ala Phe Lys Ile Tyr Asn Glu Asp Met Ala
595 600 605

Lys Val Asn Lys Thr Tyr Thr His Tyr Asn Ile Pro Ala Ala Tyr Ala
610 615 620

Leu Leu Leu Ser Asn Met Glu Ser Val Pro Arg Val Tyr Tyr Gly Asp
625 630 635 640

Leu Tyr Thr Asp Asp Gly Gln Tyr Met Ala Lys Lys Ser Pro Tyr Tyr
645 650 655

Asp Ala Ile Ala Thr Met Leu Gln Gly Arg Ile Ala Tyr Val Ser Gly
660 665 670

Gly Gln Ser Glu Glu Val His Lys Val Asn Gly Asn Asn Gln Ile Leu
675 680 685

Ser Ser Val Arg Tyr Gly Gln Asp Leu Met Ser Ala Asp Asp Thr Gln
690 695 700

Gly Thr Asp Leu Ser Arg Thr Ser Gly Leu Val Thr Leu Val Ser Asn
705 710 715 720

Asp Pro Asn Leu Asp Leu Gly Gly Asp Ser Leu Thr Val Asn Met Gly
725 730 735

Arg Ala His Ala Asn Gln Ala Tyr Arg Pro Leu Ile Leu Gly Thr Lys
740 745 750

Asp Gly Val Gln Ser Tyr Leu Lys Asp Ser Asp Thr Asn Ile Val Lys
755 760 765

Tyr Thr Asp Ala Asn Gly Asn Leu Thr Phe Thr Ala Asp Asp Ile Lys
770 775 780

Gly Tyr Ser Thr Val Asp Met Ser Gly Tyr Leu Ala Val Trp Val Pro
785 790 795 800

Val Gly Ala Lys Asp Gly Gln Asp Val Arg Val Ala Ala Asp Thr Asn

805					810					815					
Gln	Lys	Ala	Asp	Gly	Lys	Ser	Leu	Lys	Thr	Ser	Ala	Ala	Leu	Asp	Ser
			820					825					830		
Gln	Val	Ile	Tyr	Glu	Gly	Phe	Ser	Asn	Phe	Gln	Asp	Phe	Ala	Asn	Asn
			835					840					845		
Asp	Ala	Asp	Tyr	Thr	Asn	Lys	Lys	Ile	Ala	Glu	Asn	Ala	Asp	Phe	Phe
			850					855					860		
Lys	Lys	Leu	Gly	Ile	Thr	Ser	Phe	Glu	Met	Ala	Pro	Gln	Tyr	Val	Ser
			865					870					875		880
Ala	Thr	Asp	Gly	Ser	Phe	Leu	Asp	Ser	Ile	Ile	Gln	Asn	Gly	Tyr	Ala
				885					890					895	
Phe	Ser	Asp	Arg	Tyr	Asp	Leu	Ala	Met	Ser	Lys	Asn	Asn	Lys	Tyr	Gly
			900					905					910		
Ser	Lys	Asp	Asp	Leu	Ala	Asn	Ala	Leu	Lys	Ala	Leu	His	Ala	Asn	Gly
			915					920					925		
Ile	Gln	Ala	Ile	Ala	Asp	Trp	Val	Pro	Asp	Gln	Ile	Tyr	Gln	Leu	Pro
			930					935					940		
Gly	Glu	Glu	Val	Val	Thr	Ala	Lys	Arg	Thr	Asn	Ser	Tyr	Gly	Asn	Pro
			945					950					955		960
Thr	Phe	Asp	Ala	Tyr	Ile	Asn	Asn	Ala	Leu	Tyr	Ala	Thr	Asn	Thr	Lys
				965					970					975	
Ser	Ser	Gly	Ser	Asp	Tyr	Gln	Ala	Gln	Tyr	Gly	Gly	Ala	Phe	Leu	Asp
			980					985					990		
Glu	Leu	Lys	Ala	Lys	Tyr	Pro	Asp	Met	Phe	Thr	Val	Asn	Met	Ile	Ser
			995					1000					1005		
Thr	Gly	Lys	Pro	Ile	Asp	Pro	Ser	Thr	Lys	Ile	Lys	Gln	Trp	Glu	
			1010					1015					1020		
Ala	Lys	Tyr	Phe	Asn	Gly	Thr	Asn	Val	Leu	Gly	Lys	Gly	Ala	Gly	
			1025					1030					1035		

Tyr	Val	Leu	Ser	Asp	Asp	Ala	Thr	Gly	Lys	Tyr	Phe	Thr	Val	Asn
1040						1045					1050			
Glu	Asn	Gly	Asp	Phe	Leu	Pro	Ala	Ser	Phe	Thr	Gly	Asp	Gln	Asn
1055						1060					1065			
Ala	Lys	Thr	Gly	Phe	Tyr	Tyr	Asp	Gly	Thr	Gly	Met	Ala	Tyr	Tyr
1070						1075					1080			
Ser	Thr	Ser	Gly	Asn	Lys	Ala	Val	Asn	Ser	Phe	Ile	Tyr	Glu	Gly
1085						1090					1095			
Gly	His	Tyr	Tyr	Tyr	Phe	Asp	Lys	Asp	Gly	His	Met	Val	Thr	Gly
1100						1105					1110			
Ser	Tyr	Lys	Ala	Glu	Asp	Gly	Asn	Asp	Tyr	Tyr	Phe	Leu	Pro	Asn
1115						1120					1125			
Gly	Ile	Gln	Met	Arg	Asp	Ala	Ile	Tyr	Gln	Asp	Ala	Gln	Gly	Asn
1130						1135					1140			
Ser	Tyr	Tyr	Tyr	Gly	Arg	Thr	Gly	Ile	Leu	Tyr	Lys	Gly	Asp	Asn
1145						1150					1155			
Trp	Tyr	Pro	Phe	Val	Asp	Pro	Asn	Asn	Ala	Asn	Lys	Thr	Val	Phe
1160						1165					1170			
Arg	Tyr	Phe	Asp	Ala	Asn	Asn	Val	Met	Ala	Ile	Gly	Tyr	Arg	Asn
1175						1180					1185			
Met	Tyr	Gly	Gln	Thr	Tyr	Tyr	Phe	Asp	Glu	Asn	Gly	Phe	Gln	Ala
1190						1195					1200			
Lys	Gly	Gln	Leu	Leu	Thr	Asp	Asp	Lys	Gly	Thr	His	Tyr	Phe	Asp
1205						1210					1215			
Glu	Asp	Asn	Gly	Ala	Met	Ala	Lys	Asn	Lys	Phe	Val	Asn	Val	Gly
1220						1225					1230			
Asp	Asp	Trp	Tyr	Tyr	Met	Asp	Gly	Asn	Gly	Asn	Ala	Val	Lys	Gly
1235						1240					1245			

Gln Tyr	Pro Val	Asn Asn	Gln Ile	Leu Tyr	Phe Asn	Pro Glu	Thr
1250			1255		1260		
Gly Val	Gln Val	Lys Gly	Gln Phe	Ile Thr	Asp Ala	Gln Gly	Arg
1265			1270		1275		
Thr Ser	Tyr Tyr	Asp Ala	Asn Ser	Gly Ala	Leu Lys	Ser Ser	Gly
1280			1285		1290		
Phe Phe	Thr Pro	Asn Gly	Ser Asp	Trp Tyr	Tyr Ala	Glu Asn	Gly
1295			1300		1305		
Tyr Val	Tyr Lys	Gly Phe	Lys Gln	Val Ala	Glu Asn	Gln Asp	Gln
1310			1315		1320		
Trp Tyr	Tyr Phe	Asp Gln	Thr Thr	Gly Lys	Gln Ala	Lys Gly	Ala
1325			1330		1335		
Ala Lys	Val Asp	Gly Arg	Asp Leu	Tyr Phe	Asn Pro	Asp Ser	Gly
1340			1345		1350		
Val Gln	Val Lys	Gly Asp	Phe Ala	Thr Asp	Glu Ser	Gly Asn	Thr
1355			1360		1365		
Ser Phe	Tyr His	Gly Asp	Asn Gly	Asp Lys	Val Val	Gly Gly	Phe
1370			1375		1380		
Phe Thr	Thr Gly	Asn Asn	Ala Trp	Tyr Tyr	Ala Asp	Asn Asn	Gly
1385			1390		1395		
Asn Leu	Val Lys	Gly Phe	Gln Glu	Ile Asp	Gly Lys	Trp Tyr	His
1400			1405		1410		
Phe Asp	Glu Val	Thr Gly	Gln Gln	Ala Lys	Gly Ala	Ala Leu	Val
1415			1420		1425		
Asn Gly	Gln Gln	Leu Tyr	Phe Asp	Val Asp	Ser Gly	Ile Gln	Val
1430			1435		1440		
Lys Gly	Asp Phe	Val Thr	Asp Gly	Gln Gly	Asn Thr	Ser Tyr	Tyr
1445			1450		1455		

Asp Val Asn Ser Gly Asp Lys Lys Val Asn Gly Phe Phe Thr Thr
 1460 1465 1470

Gly Asp Asn Ala Trp Tyr Tyr Ala Asp Gly Gln Gly Asn Leu Ala
 1475 1480 1485

Lys Gly Arg Lys Ser Ile Asp Asn Gln Asp Leu Tyr Phe Asp Pro
 1490 1495 1500

Ala Thr Gly Lys Gln Val Lys Gly Gln Leu Val Ser Ile Asp Gly
 1505 1510 1515

Arg Asn Tyr Tyr Phe Asp Ser Gly Ser Gly Asn Met Ala Lys Asn
 1520 1525 1530

Arg Phe Val Arg Ile Gly Asp Gln Trp Ile Tyr Phe Gly Asn Asp
 1535 1540 1545

Gly Ala Ala Thr Asn Leu
 1550

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 <211> 1365
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<400> 39

Met Glu Lys Asn Leu Arg Tyr Lys Leu His Lys Val Lys Lys Gln Trp
 1 5 10 15

Val Ala Ile Gly Val Thr Thr Val Thr Leu Ser Phe Leu Ala Gly Gly
 20 25 30

Gln Val Val Ala Ala Asp Thr Asn Asn Asn Asp Gly Thr Ser Val Gln
 35 40 45

Val Asn Lys Met Val Pro Ser Asp Pro Lys Phe Asp Ala Gln Ala Gln
 50 55 60

Asn Gly Gln Leu Ala Gln Ala Met Phe Lys Ala Ala Asn Gln Ala Asp
 65 70 75 80

Gln Thr Ala Thr Ser Gln Val Ser Pro Ala Thr Asp Gly Arg Val Asp
 85 90 95

Asn	Gln	Val	Thr	Pro	Ala	Ala	Asn	Gln	Pro	Ala	Ala	Asn	Val	Ala	Asn		
			100					105					110				
Gln	Asp	Val	Ala	Asn	Pro	Ala	Thr	Asp	Ala	Gly	Ala	Leu	Asn	Arg	Gln		
		115					120					125					
Ser	Ala	Ala	Asp	Thr	Ser	Thr	Asp	Gly	Lys	Ala	Val	Pro	Gln	Thr	Ser		
	130					135					140						
Asp	Gln	Pro	Gly	His	Leu	Glu	Thr	Val	Asp	Gly	Lys	Thr	Tyr	Tyr	Val		
145					150					155					160		
Asp	Ala	Asn	Gly	Gln	Arg	Leu	Lys	Asn	Tyr	Ser	Met	Val	Ile	Asp	Gly		
				165					170					175			
Lys	Thr	Tyr	Tyr	Phe	Asp	Gly	Gln	Thr	Gly	Glu	Ala	Gln	Thr	Asp	Leu		
			180					185					190				
Pro	Lys	Thr	Gly	Gln	Ala	Asn	Gln	Asp	Asn	Val	Pro	Asp	Ser	Tyr	Gln		
		195					200					205					
Ala	Asn	Asn	Gln	Ala	Tyr	Ser	Asn	Glu	Ala	Ser	Ser	Phe	Glu	Thr	Val		
	210					215					220						
Asp	Asn	Tyr	Leu	Thr	Ala	Asp	Ser	Trp	Tyr	Arg	Pro	Arg	Lys	Ile	Leu		
225					230					235					240		
Lys	Asn	Gly	Gln	Ser	Trp	Gln	Ala	Ser	Ser	Glu	Gly	Asp	Leu	Arg	Pro		
				245					250					255			
Ile	Leu	Met	Thr	Trp	Trp	Pro	Asp	Ala	Ala	Thr	Lys	Ala	Ala	Tyr	Ala		
			260					265					270				
Asn	Phe	Trp	Ala	Lys	Glu	Gly	Leu	Ile	Ser	Gly	Ser	Tyr	Arg	Gln	Asn		
		275					280					285					
Ser	Ala	Asn	Leu	Asp	Ala	Ala	Thr	Gln	Asn	Ile	Gln	Ser	Ala	Ile	Glu		
	290					295					300						
Lys	Lys	Ile	Ala	Ser	Glu	Gly	Asn	Thr	Asn	Trp	Leu	Arg	Asp	Lys	Met		
305					310					315					320		

Ser Gln Phe Val Lys Ser Gln Asn Gln Trp Ser Ile Ala Ser Glu Asn
325 330 335

Glu Thr Val Tyr Pro Asn Gln Asp His Met Gln Gly Gly Ala Leu Leu
340 345 350

Phe Ser Asn Ser Lys Asp Thr Glu His Ala Asn Ser Asp Trp Arg Leu
355 360 365

Leu Asn Arg Asn Pro Thr Phe Gln Thr Gly Lys Gln Lys Tyr Phe Thr
370 375 380

Thr Asn Tyr Ala Gly Tyr Glu Leu Leu Leu Ala Asn Asp Val Asp Asn
385 390 395 400

Ser Asn Pro Val Val Gln Ala Glu Gln Leu Asn His Leu His Tyr Leu
405 410 415

Met Asn Trp Gly Asp Ile Val Met Gly Asp Lys Asp Ala Asn Phe Asp
420 425 430

Gly Val Arg Val Asp Ala Val Asp Asn Val Asn Ala Asp Leu Leu Gln
435 440 445

Ile Gln Arg Asp Tyr Tyr Lys Ala Lys Tyr Gly Thr Asp Gln Asn Glu
450 455 460

Lys Asn Ala Ile Asp His Leu Ser Ile Leu Glu Ala Trp Ser Gly Asn
465 470 475 480

Asp Asn Asp Tyr Val Lys Asp Gln Asn Asn Phe Ser Leu Ser Ile Asp
485 490 495

Asn Asp Gln Arg Ser Gly Met Leu Lys Ala Phe Gly Tyr Ala Ser Ala
500 505 510

Tyr Arg Gly Asn Leu Ser Asn Leu Ala Thr Ala Gly Leu Lys Asn Arg
515 520 525

Ser Ala Asn Pro Asp Ser Asp Pro Val Pro Asn Tyr Val Phe Ile Arg
530 535 540

Ala His Asp Ser Glu Val Gln Thr Arg Ile Ala Lys Ile Ile Arg Glu
 545 550 555 560

Lys Leu Gly Lys Thr Asn Ala Asp Gly Leu Thr Asn Leu Thr Leu Asp
 565 570 575

Asp Leu Asn Lys Ala Phe Asp Ile Tyr Asn Gln Asp Met Asn Ala Thr
 580 585 590

Asp Lys Val Tyr Tyr Pro Asn Asn Leu Pro Met Ala Tyr Ala Trp Met
 595 600 605

Leu Gln Asn Lys Asp Thr Val Thr Arg Val Tyr Tyr Gly Asp Met Tyr
 610 615 620

Thr Asp Asn Gly Gln Tyr Met Ala Thr Lys Thr Pro Phe Tyr Asn Ala
 625 630 635 640

Ile Glu Thr Leu Leu Lys Gly Arg Ile Lys Tyr Val Ala Gly Gly Gln
 645 650 655

Ala Val Ser Tyr Lys Gln Asp Trp Ser Ser Gly Ile Leu Thr Ser Val
 660 665 670

Arg Tyr Gly Lys Gly Ala Asn Ser Ala Ser Asp Ala Gly Asn Thr Glu
 675 680 685

Thr Arg Asn Ser Gly Met Ala Leu Leu Ile Asn Asn Arg Pro Asn Phe
 690 695 700

Arg Ala Tyr Arg Asn Leu Thr Leu Asn Met Gly Ala Ala His Lys Ser
 705 710 715 720

Gln Ala Tyr Arg Pro Leu Leu Leu Ser Thr Lys Asp Gly Ile Ala Thr
 725 730 735

Tyr Leu Asn Asp Ser Asp Val Asp Ser Arg Gln Tyr Lys Tyr Thr Asp
 740 745 750

Ser Gln Gly Asn Leu Ser Phe Ser Ala Ser Glu Leu Gln Ser Val Ala
 755 760 765

Asn Ala Gln Val Ser Gly Met Ile Gln Val Trp Val Pro Val Gly Ala

770						775						780					
Ala	Asp	Asn	Gln	Asp	Val	Arg	Thr	Ser	Pro	Ser	Thr	Gln	Ala	Thr	Lys		
785					790					795					800		
Asp	Gly	Asn	Ile	Tyr	His	Gln	Ser	Asp	Ala	Leu	Asp	Ser	Gln	Val	Ile		
			805						810					815			
Tyr	Glu	Gly	Phe	Ser	Asn	Phe	Gln	Ala	Phe	Ala	Gln	Ser	Pro	Asp	Gln		
			820					825					830				
Tyr	Thr	Asn	Ala	Val	Ile	Ala	Lys	Asn	Gly	Asp	Leu	Phe	Lys	Ser	Trp		
		835					840					845					
Gly	Ile	Thr	Gln	Phe	Glu	Met	Ala	Pro	Gln	Tyr	Val	Ser	Ser	Glu	Asp		
	850					855					860						
Gly	Thr	Phe	Leu	Asp	Ser	Val	Ile	Leu	Asn	Gly	Tyr	Ala	Phe	Ser	Asp		
865					870					875					880		
Arg	Tyr	Asp	Leu	Ala	Met	Ser	Lys	Asn	Asn	Lys	Tyr	Gly	Ser	Lys	Gln		
			885					890						895			
Asp	Leu	Ala	Asn	Ala	Ile	Lys	Gly	Leu	Gln	Ser	Ala	Gly	Ile	Lys	Val		
		900						905					910				
Leu	Ser	Asp	Leu	Val	Pro	Asn	Gln	Leu	Tyr	Asn	Leu	Pro	Gly	Lys	Glu		
		915					920					925					
Val	Val	Thr	Ala	Thr	Arg	Val	Asn	Gln	Tyr	Gly	Gln	Ala	Lys	Ser	Gly		
	930					935					940						
Ala	Thr	Ile	Asn	Lys	Thr	Pro	Tyr	Val	Ala	Asn	Thr	Arg	Ser	Tyr	Gly		
945					950					955					960		
Asp	Tyr	Gln	Glu	Gln	Tyr	Gly	Gly	Lys	Phe	Leu	Asp	Asp	Leu	Gln	Lys		
			965					970						975			
Leu	Tyr	Pro	Arg	Leu	Phe	Ser	Thr	Lys	Gln	Ile	Ser	Thr	Gly	Lys	Pro		
		980						985					990				
Ile	Asp	Pro	Ser	Val	Lys	Ile	Thr	Asn	Trp	Ser	Ala	Lys	Tyr	Phe	Asn		
	995						1000					1005					

Gly	Ser	Asn	Ile	Leu	Gly	Arg	Gly	Ala	Lys	Tyr	Val	Leu	Ser	Glu
1010						1015					1020			
Gly	Asn	Lys	Tyr	Leu	Asn	Leu	Ala	Asp	Gly	Lys	Leu	Phe	Leu	Pro
1025						1030					1035			
Thr	Val	Leu	Asn	Asn	Thr	Tyr	Gly	Gln	Pro	Gln	Val	Ser	Ala	Asn
1040						1045					1050			
Gly	Phe	Ile	Ser	Lys	Asn	Gly	Gly	Ile	His	Tyr	Leu	Asp	Lys	Asn
1055						1060					1065			
Gly	Gln	Glu	Val	Lys	Asn	Arg	Phe	Lys	Glu	Ile	Ser	Gly	Ser	Trp
1070						1075					1080			
Tyr	Tyr	Phe	Asp	Ser	Asp	Gly	Lys	Met	Ala	Thr	Gly	Lys	Thr	Lys
1085						1090					1095			
Ile	Gly	Asn	Asp	Thr	Tyr	Leu	Phe	Met	Pro	Asn	Gly	Lys	Gln	Leu
1100						1105					1110			
Lys	Glu	Gly	Val	Trp	Tyr	Asp	Gly	Lys	Lys	Ala	Tyr	Tyr	Tyr	Asp
1115						1120					1125			
Asp	Asn	Gly	Arg	Thr	Trp	Thr	Asn	Lys	Gly	Phe	Val	Glu	Phe	Arg
1130						1135					1140			
Val	Asp	Gly	Gln	Asp	Lys	Trp	Arg	Tyr	Phe	Asn	Gly	Asp	Gly	Thr
1145						1150					1155			
Ile	Ala	Ile	Gly	Leu	Val	Ser	Leu	Asp	Asn	Arg	Thr	Leu	Tyr	Phe
1160						1165					1170			
Asp	Ala	Tyr	Gly	Tyr	Gln	Val	Lys	Gly	Gln	Thr	Val	Thr	Ile	Asn
1175						1180					1185			
Gly	Lys	Ser	Tyr	Thr	Phe	Asp	Ala	Asp	Gln	Gly	Asp	Leu	Val	Gln
1190						1195					1200			
Thr	Asp	Asn	Ala	Asn	Pro	Ala	Pro	Gln	Gly	Gln	Ala	Gly	Trp	Lys
1205						1210					1215			

Leu Leu Gly Asp Asn Gln Trp Gly Tyr Arg Lys Asp Gly Gln Leu
 1220 1225 1230

Leu Thr Gly Glu Gln Thr Ile Asp Gly Gln Lys Val Phe Phe Gln
 1235 1240 1245

Asp Asn Gly Val Gln Val Lys Gly Gly Thr Ala Thr Asp Ala Ser
 1250 1255 1260

Gly Val Leu Arg Phe Tyr Asp Arg Asp Gln Gly His Gln Val Gly
 1265 1270 1275

Lys Gly Trp Tyr Ser Thr Ser Asp Asp Asn Trp Val Tyr Val Asn
 1280 1285 1290

Glu Ser Gly Gln Val Leu Thr Gly Leu Gln Thr Ile Asp Gly Gln
 1295 1300 1305

Thr Val Tyr Phe Asp Asp Lys Gly Ile Gln Ala Lys Gly Lys Ala
 1310 1315 1320

Val Trp Asp Glu Asn Gly Asn Leu Arg Tyr Phe Asp Ala Asp Ser
 1325 1330 1335

Gly Asn Met Leu Arg Asp Arg Trp Lys Asn Val Asp Gly Asn Trp
 1340 1345 1350

Tyr Tyr Phe Asn Arg Asn Gly Leu Ala Thr Arg Trp
 1355 1360 1365

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 <212> PRT
 <213> Streptococcus salivarius

<400> 40

Met Glu Asn Lys Ile His Tyr Lys Leu His Lys Val Lys Lys Gln Trp
 1 5 10 15

Val Thr Ile Ala Val Ala Ser Val Ala Leu Ala Thr Val Leu Gly Gly
 20 25 30

Leu Ser Val Thr Thr Ser Ser Val Ser Ala Asp Glu Thr Gln Asp Lys

35	40	45													
Thr	Val	Thr	Gln	Ser	Asn	Ser	Gly	Thr	Thr	Ala	Ser	Leu	Val	Thr	Ser
50					55						60				
Pro	Glu	Ala	Thr	Lys	Glu	Ala	Asp	Lys	Arg	Thr	Asn	Thr	Lys	Glu	Ala
65					70					75					80
Asp	Val	Leu	Thr	Pro	Ala	Lys	Glu	Thr	Asn	Ala	Val	Glu	Thr	Ala	Thr
				85					90					95	
Thr	Thr	Asn	Thr	Gln	Ala	Thr	Ala	Glu	Ala	Ala	Thr	Thr	Ala	Thr	Thr
			100					105					110		
Ala	Asp	Val	Ala	Val	Ala	Ala	Val	Pro	Asn	Lys	Glu	Ala	Val	Val	Thr
	115						120					125			
Thr	Asp	Ala	Pro	Ala	Val	Thr	Thr	Glu	Lys	Ala	Glu	Glu	Gln	Pro	Ala
130						135					140				
Thr	Val	Lys	Ala	Glu	Val	Val	Asn	Thr	Glu	Val	Lys	Ala	Pro	Glu	Ala
145					150					155					160
Ala	Leu	Lys	Asp	Ser	Glu	Val	Glu	Ala	Ala	Leu	Ser	Leu	Lys	Asn	Ile
				165					170					175	
Lys	Asn	Ile	Asp	Gly	Lys	Tyr	Tyr	Tyr	Val	Asn	Glu	Asp	Gly	Ser	His
			180					185					190		
Lys	Glu	Asn	Phe	Ala	Ile	Thr	Val	Asn	Gly	Gln	Leu	Leu	Tyr	Phe	Gly
	195						200					205			
Lys	Asp	Gly	Ala	Leu	Thr	Ser	Ser	Ser	Thr	Tyr	Ser	Phe	Thr	Pro	Gly
	210					215					220				
Thr	Thr	Asn	Ile	Val	Asp	Gly	Phe	Ser	Ile	Asn	Asn	Arg	Ala	Tyr	Asp
225					230					235					240
Ser	Ser	Glu	Ala	Ser	Phe	Glu	Leu	Ile	Asp	Gly	Tyr	Leu	Thr	Ala	Asp
				245					250					255	
Ser	Trp	Tyr	Arg	Pro	Ala	Ser	Ile	Ile	Lys	Asp	Gly	Val	Thr	Trp	Gln
			260					265					270		

Ala Ser Thr Ala Glu Asp Phe Arg Pro Leu Leu Met Ala Trp Trp Pro
 275 280 285

Asn Val Asp Thr Gln Val Asn Tyr Leu Asn Tyr Met Ser Lys Val Phe
 290 295 300

Asn Leu Asp Ala Lys Tyr Ser Ser Thr Asp Lys Gln Glu Thr Leu Lys
 305 310 315 320

Val Ala Ala Lys Asp Ile Gln Ile Lys Ile Glu Gln Lys Ile Gln Ala
 325 330 335

Glu Lys Ser Thr Gln Trp Leu Arg Glu Thr Ile Ser Ala Phe Val Lys
 340 345 350

Thr Gln Pro Gln Trp Asn Lys Glu Thr Glu Asn Tyr Ser Lys Gly Gly
 355 360 365

Gly Glu Asp His Leu Gln Gly Gly Ala Leu Leu Tyr Val Asn Asp Ser
 370 375 380

Arg Thr Pro Trp Ala Asn Ser Asp Tyr Arg Arg Leu Asn Arg Thr Ala
 385 390 395 400

Thr Asn Gln Thr Gly Thr Ile Asp Lys Ser Ile Leu Asp Glu Gln Ser
 405 410 415

Asp Pro Asn His Met Gly Gly Phe Asp Phe Leu Leu Ala Asn Asp Val
 420 425 430

Asp Leu Ser Asn Pro Val Val Gln Ala Glu Gln Leu Asn Gln Ile His
 435 440 445

Tyr Leu Met Asn Trp Gly Ser Ile Val Met Gly Asp Lys Asp Ala Asn
 450 455 460

Phe Asp Gly Ile Arg Val Asp Ala Val Asp Asn Val Asp Ala Asp Met
 465 470 475 480

Leu Gln Leu Tyr Thr Asn Tyr Phe Arg Glu Tyr Tyr Gly Val Asn Lys
 485 490 495

Ser Glu Ala Asn Ala Leu Ala His Ile Ser Val Leu Glu Ala Trp Ser
500 505 510

Leu Asn Asp Asn His Tyr Asn Asp Lys Thr Asp Gly Ala Ala Leu Ala
515 520 525

Met Glu Asn Lys Gln Arg Leu Ala Leu Leu Phe Ser Leu Ala Lys Pro
530 535 540

Ile Lys Glu Arg Thr Pro Ala Val Ser Pro Leu Tyr Asn Asn Thr Phe
545 550 555 560

Asn Thr Thr Gln Arg Asp Glu Lys Thr Asp Trp Ile Asn Lys Asp Gly
565 570 575

Ser Lys Ala Tyr Asn Glu Asp Gly Thr Val Lys Gln Ser Thr Ile Gly
580 585 590

Lys Tyr Asn Glu Lys Tyr Gly Asp Ala Ser Gly Asn Tyr Val Phe Ile
595 600 605

Arg Ala His Asp Asn Asn Val Gln Asp Ile Ile Ala Glu Ile Ile Lys
610 615 620

Lys Glu Ile Asn Pro Lys Ser Asp Gly Phe Thr Ile Thr Asp Ala Glu
625 630 635 640

Met Lys Gln Ala Phe Glu Ile Tyr Asn Lys Asp Met Leu Ser Ser Asp
645 650 655

Lys Lys Tyr Thr Leu Asn Asn Ile Pro Ala Ala Tyr Ala Val Met Leu
660 665 670

Gln Asn Met Glu Thr Ile Thr Arg Val Tyr Tyr Gly Asp Leu Tyr Thr
675 680 685

Asp Asp Gly His Tyr Met Glu Thr Lys Ser Pro Tyr Tyr Asp Thr Ile
690 695 700

Val Asn Leu Met Lys Ser Arg Ile Lys Tyr Val Ser Gly Gly Gln Ala
705 710 715 720

Gln Arg Ser Tyr Trp Leu Pro Thr Asp Gly Lys Met Asp Asn Ser Asp
725 730 735

Val Glu Leu Tyr Arg Thr Asn Glu Val Tyr Thr Ser Val Arg Tyr Gly
740 745 750

Lys Asp Ile Met Thr Ala Asn Asp Thr Glu Gly Ser Lys Tyr Ser Arg
755 760 765

Thr Ser Gly Gln Val Thr Leu Val Ala Asn Asn Pro Lys Leu Asn Leu
770 775 780

Asp Gln Ser Ala Lys Leu Asn Val Glu Met Gly Lys Ile His Ala Asn
785 790 795 800

Gln Lys Tyr Arg Ala Leu Ile Val Gly Thr Ala Asp Gly Ile Lys Asn
805 810 815

Phe Thr Ser Asp Ala Asp Ala Ile Ala Ala Gly Tyr Val Lys Glu Thr
820 825 830

Asp Ser Asn Gly Val Leu Thr Phe Gly Ala Asn Asp Ile Lys Gly Tyr
835 840 845

Glu Thr Phe Asp Met Ser Gly Phe Val Ala Val Trp Val Pro Val Gly
850 855 860

Ala Ser Asp Asn Gln Asp Ile Arg Val Ala Pro Ser Thr Glu Ala Lys
865 870 875 880

Lys Glu Gly Glu Leu Thr Leu Lys Ala Thr Glu Ala Tyr Asp Ser Gln
885 890 895

Leu Ile Tyr Glu Gly Phe Ser Asn Phe Gln Thr Ile Pro Asp Gly Ser
900 905 910

Asp Pro Ser Val Tyr Thr Asn Arg Lys Ile Ala Glu Asn Val Asp Leu
915 920 925

Phe Lys Ser Trp Gly Val Thr Ser Phe Glu Met Ala Pro Gln Phe Val
930 935 940

Ser Ala Asp Asp Gly Thr Phe Leu Asp Ser Val Ile Gln Asn Gly Tyr

945		950		955		960
Ala Phe Ala Asp Arg Tyr Asp Leu Ala Met Ser Lys Asn Asn Lys Tyr						
		965		970		975
Gly Ser Lys Glu Asp Leu Arg Asp Ala Leu Lys Ala Leu His Lys Ala						
		980		985		990
Gly Ile Gln Ala Ile Ala Asp Trp Val Pro Asp Gln Ile Tyr Gln Leu						
		995		1000		1005
Pro Gly Lys Glu Val Val Thr Ala Thr Arg Thr Asp Gly Ala Gly						
		1010		1015		1020
Arg Lys Ile Ala Asp Ala Ile Ile Asp His Ser Leu Tyr Val Ala						
		1025		1030		1035
Asn Ser Lys Ser Ser Gly Lys Asp Tyr Gln Ala Lys Tyr Gly Gly						
		1040		1045		1050
Glu Phe Leu Ala Glu Leu Lys Ala Lys Tyr Pro Glu Met Phe Lys						
		1055		1060		1065
Val Asn Met Ile Ser Thr Gly Lys Pro Ile Asp Asp Ser Val Lys						
		1070		1075		1080
Leu Lys Gln Trp Lys Ala Glu Tyr Phe Asn Gly Thr Asn Val Leu						
		1085		1090		1095
Glu Arg Gly Val Gly Tyr Val Leu Ser Asp Glu Ala Thr Gly Lys						
		1100		1105		1110
Tyr Phe Thr Val Thr Lys Glu Gly Asn Phe Ile Pro Leu Gln Leu						
		1115		1120		1125
Thr Gly Lys Glu Lys Val Ile Thr Gly Phe Ser Ser Asp Gly Lys						
		1130		1135		1140
Gly Ile Thr Tyr Phe Gly Thr Ser Gly Thr Gln Ala Lys Ser Ala						
		1145		1150		1155
Phe Val Thr Phe Asn Gly Asn Thr Tyr Tyr Phe Asp Ala Arg Gly						
		1160		1165		1170

His	Met	Val	Thr	Asn	Ser	Glu	Tyr	Ser	Pro	Asn	Gly	Lys	Asp	Val
	1175					1180					1185			
Tyr	Arg	Phe	Leu	Pro	Asn	Gly	Ile	Met	Leu	Ser	Asn	Ala	Phe	Tyr
	1190					1195					1200			
Ile	Asp	Ala	Asn	Gly	Asn	Thr	Tyr	Leu	Tyr	Asn	Ser	Lys	Gly	Gln
	1205					1210					1215			
Met	Tyr	Lys	Gly	Gly	Tyr	Thr	Lys	Phe	Asp	Val	Ser	Glu	Thr	Asp
	1220					1225					1230			
Lys	Asp	Gly	Lys	Glu	Ser	Lys	Val	Val	Lys	Phe	Arg	Tyr	Phe	Thr
	1235					1240					1245			
Asn	Glu	Gly	Val	Met	Ala	Lys	Gly	Val	Thr	Val	Ile	Asp	Gly	Phe
	1250					1255					1260			
Thr	Gln	Tyr	Phe	Gly	Glu	Asp	Gly	Phe	Gln	Ala	Lys	Asp	Lys	Leu
	1265					1270					1275			
Val	Thr	Phe	Lys	Gly	Lys	Thr	Tyr	Tyr	Phe	Asp	Ala	His	Thr	Gly
	1280					1285					1290			
Asn	Gly	Ile	Lys	Asp	Thr	Trp	Arg	Asn	Ile	Asn	Gly	Lys	Trp	Tyr
	1295					1300					1305			
Tyr	Phe	Asp	Ala	Asn	Gly	Val	Ala	Ala	Thr	Gly	Ala	Gln	Val	Ile
	1310					1315					1320			
Asn	Gly	Gln	Lys	Leu	Tyr	Phe	Asn	Glu	Asp	Gly	Ser	Gln	Val	Lys
	1325					1330					1335			
Gly	Gly	Val	Val	Lys	Asn	Ala	Asp	Gly	Thr	Tyr	Ser	Lys	Tyr	Lys
	1340					1345					1350			
Glu	Gly	Phe	Gly	Glu	Leu	Val	Thr	Asn	Glu	Phe	Phe	Thr	Thr	Asp
	1355					1360					1365			
Gly	Asn	Val	Trp	Tyr	Tyr	Ala	Gly	Ala	Asn	Gly	Lys	Thr	Val	Thr
	1370					1375					1380			

Gly Ala Gln Val Ile Asn Gly Gln His Leu Tyr Phe Asn Ala Asp
 1385 1390 1395

Gly Ser Gln Val Lys Gly Gly Val Val Lys Asn Ala Asp Gly Thr
 1400 1405 1410

Tyr Ser Lys Tyr Asn Ala Ser Thr Gly Glu Arg Leu Thr Asn Glu
 1415 1420 1425

Phe Phe Thr Thr Gly Asp Asn Asn Trp Tyr Tyr Ile Gly Ala Asn
 1430 1435 1440

Gly Lys Ser Val Thr Gly Glu Val Lys Ile Gly Asp Asp Thr Tyr
 1445 1450 1455

Phe Phe Ala Lys Asp Gly Lys Gln Val Lys Gly Gln Thr Val Ser
 1460 1465 1470

Ala Gly Asn Gly Arg Ile Ser Tyr Tyr Tyr Gly Asp Ser Gly Lys
 1475 1480 1485

Arg Ala Val Ser Thr Trp Ile Glu Ile Gln Pro Gly Val Tyr Val
 1490 1495 1500

Tyr Phe Asp Lys Asn Gly Leu Ala Tyr Pro Pro Arg Val Leu Asn
 1505 1510 1515

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 <213> Artificial

<220>
 <223> GbpB peptide

<400> 41

Gly Asn Tyr Trp Gly Asn Gly Gly Gln Trp Ala Ala Ser Ala Ala Ala
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Ala Gly Arg Tyr
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<210> 42
 <211> 21

<212> PRT
<213> Streptococcus sobrinus

<400> 42

Asn Asn His Val Ser Ile Val Glu Ala Trp Ser Asp Asn Asp Thr Pro
1 5 10 15

Tyr Leu His Asp Asp
20

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<400> 43

Val Val Ile Ala Asn Asn Val Asp Lys Phe Val Ser Trp Gly Ile Thr
1 5 10 15

Asp Phe Glu Met
20

<210> 44
<211> 20
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<400> 44

Val Thr Asp Ser Glu Ala Asn Ala Leu Ala His Ile Ser Ile Leu Glu
1 5 10 15

Ala Trp Ser Leu
20

<210> 45
<211> 20
<212> PRT
<213> Streptococcus sobrinus

<400> 45

Asn Asn Asp Ala Asp Tyr Thr Asn Lys Lys Ile Ala Glu Asn Ala Asp
1 5 10 15

Phe Phe Lys Lys
20